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THE GREEK CONCEPTION OF NATURE[1]

SCIENTIFIC speculation among the Greeks began vaguely with Hesiod, became articulate with the Milesians, and culminated in Aristotle's philosophy of nature. The development is both native and continuous. The culture of the Greeks is the spontaneous creation of their own genius. Their views about man and nature and God are the natural products of their own instinctive feelings and attitudes. After the period of the invasions and migrations and mixing of races, the Greeks developed a native cultural consciousness at once genial, responsive and energetic. It is true that the distinction between Greek and barbarian received literary expression only relatively late. Nevertheless, the feeling of cultural solidarity expressed itself very early in their history. Greece was not a geographic term; Greece was where the Greeks were.

With the single exception of the Dionysiac religion, which was most certainly Thracian in origin, I know of no single foreign influence that in any radical way subverted or transformed the native genius of the Greeks. This one exception, however, is of great importance because the Dionysiac and Orphic religions profoundly influenced Greek cosmology and Greek views of the soul. After the epic period, with this one notable exception, Greek life was not subject to any violent upheavals from within or any terrifying invasions from without. Their internal differences enabled them to create a variety of ideas while their cultural homogeneity kept their many-sided speculations within the limits of integrated racial consciousness. This is amazing when we re-

[1] Address of the President of the Western Division of the American Philosophical Association, delivered before the joint session of the Eastern, Pacific and Western Divisions held at the University of Chicago, September 6-9, 1933.

flect, as Gilbert Murray has pointed out, that Greek culture was an oasis almost completely surrounded by barbarian custom and savage practice.

Confidence in their cultural integrity lends to the development of Greek thought a distinctive continuity. I think the assumption of continuity is important. As an illustration of discontinuity, we may take the progress of later European thought where all is conflict, adjustment and assimilation of foreign ideas. The first effort at integration is that of Philo in which the Greek and Hebraic are in juxtaposition. Plotinus is oriental, Egyptian, Roman and Greek. St. Augustine expresses a synthesis of Greek, neo-Platonic and Christian. The writings of Pseudo-Dionysius are a fantasy of oriental, neo-Platonic, Hebraic, Christian, Greek and early medieval. Later we have the great syntheses of the Hebraic and Greek in Moses Maimonides, and of the Greek and Christian in St. Thomas. Everywhere thought is a compromise of radically conflicting and divergent points of view.

Greek intellectual development, on the other hand, is the native product of an internal and expanding effort at self-expression. No movement was lost and no energy diverted in adjustment to an uncongenial invasion of foreign ideas. As a result Greek scientific thought comes to fruition in the amazingly short period of three centuries. The continuous attack on common problems by men with common interest and a common background is equivalent to the prolongation of life and the enlargement of effort. This is the only way I can explain the prodigious work of Aristotle. No one man could possibly, in the space of so short a life, amass so tremendous a volume of scientific description and analysis. Aristotle, with the combined aid of an organized staff of assistants, utilizes the accomplishments of all his predecessors in the effort to solve the problems which they had formulated. His scientific work is the culmination of prolonged and continuous meditation upon the central interest of Ionian science, namely, the meaning of "nature" and man's place in it.

It is true, of course, that influences came in from abroad, but the Greeks always maintained control over foreign ideas, and, as Plato says, "Whatever the Greeks borrowed from the barbarian they always made better in the end". Scattered fragments of

mathematical and astronomical knowledge sifted in from Egypt and from the East, but they in no way altered the philosophical background already established. Foreign influences, even in the pre-epic period, have probably been exaggerated. Mylonas has shown, in his very recent excavations at Eleusis, that the oldest of the temples of Demeter dates as far back as the fifteenth century B.C. and that it shows no Egyptian influence.

It is not my purpose to take the Greek conception of nature as an illustration of continuity, but rather to use the hypothesis of continuity as a means of interpreting the Greek conception of nature. It is for this reason that I shall attach so much weight to the testimony of Aristotle. What is certain in the end lends clarity to what is vague in the beginning.

From beginning to end Ionian thought is dominated by an intense interest in "nature". The chief objects of speculative interests center around the origin of the world, the character of primary existence, and the processes of change and growth which are continually going on in the physical world. Above all the Greeks were interested in life, and they instituted a persistent search for its undying source. Their earliest recorded reflections were directed towards an explanation of the most general facts of observation. Looking out on the world, one sees things moving, changing, living, growing and feeling. How are we to explain these obvious facts? What is it in things that makes them live and grow? What is sensation and how is it that we are able to see and feel and think? Answers to these questions furnish us with the first fruits of philosophical speculation.

There is a dual character in all speculation. It flows from antecedent ideas and is guided by observation and interest. Philosophy did not begin *ab initio* with the Milesians. They inherited a common body of knowledge which was grounded in earlier experience. They began with what they had and what they had was a very intricate and complicated system of ideas whose antecedents reached far back into earlier past. They inherited views about the "divine" and "nature" and "soul" which were as familiar to them as gravity and the principles of Euclid are to us.

From the beginning of modern times our views of nature have been worked out in terms of mathematical physics. The mechani-

cal view of nature received its most general theoretical formulation with Descartes, its exact mathematical formulation with Newton, and its extensive elaboration with subsequent physicists. The general view that nature is a system of things, events and laws operating with mechanical necessity has been the assumption underlying nearly all modern scientific inquiry. Whether we think of the ultimate substance of physical existence as homogeneous matter, or atoms, or ether, or electrons, the more general notion that nature, of whatever it may be composed, is subject to a single system of impersonal causal laws has everywhere prevailed. Science in its detail has progressed under the control of this more general view of nature.

In this respect the same thing is true of Greek thought. A broad conception of nature may be detected behind the specific advances of philosophic thought. The early philosophers were not the first to establish a view of nature. On the contrary, they thought in terms of a view that already expressed the common inheritance of a traditional past.

We may now formulate in the most general way the traditional view of nature.

1. Nature is Life. All of the early literary associations of the word *Physis* are with the phenomena of vitality. To the Greek, nature was alive. The substance of life penetrates all being. The force which manifests itself in the psyche of man is the same force that works and rules in all matter. In fact the whole of Ionian speculation is dominated by the confident belief in the essential unity of man and nature. The basal category is the category of "life". Nature is a living substance which contains within itself the inherent power of absolute life.

2. Nature is Power. Nature, being alive, possesses inherently all the resources necessary for movement, change and growth. It is the self-producing power that creates, preserves and rules the world. The Greeks did not think in terms of such concepts as matter *and* force. Nature was a substance endowed with the power of self-movement. Whatever is alive moves itself, and whatever moves itself is alive. No distinction was made between mechanical force and vital activity. All activity was vital activity. Na-

ture is a living substance endowed with the power of absolute movement. It is the essence of those things which contain within themselves the power of initiating change. Even in the medical system of Hippocrates the art of the physician is based on the conception of *Physis* as the healing power of nature.

3. Nature is Soul. Self-movement is another name for life. Soul is the very substance of life. This view is so characteristic of both Plato and Aristotle, and the passages in which it is expressed are so well known, that it is unnecessary to quote them. The substance of their views may be summarized as follows. The soul is the inherent substance and principle of life, motion and sense-perception. Whatever is alive or possesses the power of self-movement or perceives, lives and moves and knows by virtue of its psyche. This view is as old as Homer. Soul is a substantial part of nature, or what is the same thing, what we call psychology and physics are treated by the Greeks as different aspects of one reality. Man and nature comprise a single order.

4. Nature is divine. Here we meet what is perhaps the most important aspect of the Greek conception of nature.

In modern times the most severe intellectual conflicts have arisen over the rival claims of science and religion. For the most part scientific conceptions of nature have been so framed as to leave no room for a religious interpretation of the world. Naturalism has claimed that physical reality is all there is, and that it is impersonal and everywhere subject to the law of causality. On this view, we have contrasted 'natural' with 'supernatural', 'scientific' with 'theological', and 'physical' with 'mental'. Now so far as I know, with the possible exception of Anaxagoras, no conflict ever arose among the Greeks between science and religion. The reason for this lies in the fact that for the Greek "the divine encloses the whole of nature". Thus writes Plato:

> And of the stars too, and of the moon, and of the years and months and seasons, must we not say in like manner, that since a soul or souls having every part of excellence are the causes of all of them, those souls are Gods, whether they are living beings and reside in bodies, and in this way order the whole heaven, or whatever be the place and mode of their existence;—and will any one who admits all this venture to deny that all things are full of Gods?[3]

[3] *Laws* 899b. Jowett's translation.

That nature is divine is, according to Aristotle, the one fact about the views of his predecessors that stands out in undisputed clearness. He writes:

> Our forefathers in the most remote ages have handed down to us their posterity a tradition, in the form of a myth, that these substances are gods and that the divine encloses the whole of nature. The rest of the tradition has been added later in mythical form with a view to the persuasion of the multitude and to its legal and utilitarian expediency; they say these gods are in the form of men or like some of the other animals, and they say other things consequent on and similar to these which we have mentioned. But if we were to separate the first point from these additions and take it alone—that they thought the first substances to be gods, we must regard this as an inspired utterance, and reflect that, while probably each art and science has often been developed as far as possible and has again perished, these opinions have been preserved until the present, like relics of the ancient treasure. Only thus far, then, is the opinion of our ancestors and our earliest predecessors clear to us.[3]

It should be remembered, too, that with Aristotle theology is the crowning work of metaphysics. God is the principle on which "depend the heavens and the whole of nature".[4] These passages are so conclusive and the place assigned to God in the physical system of both Plato and Aristotle is so prominent that I cannot understand how anyone can treat the Milesians as scientists who rejected all theological ideas, without affirming a total discontinuity in what is otherwise a continuous development. The concept of the "divine", of course, underwent marked change. In the beginning the "divine" was an attribute of "nature", and "nature" was thought of as wholly corporeal. In the progress of thought, and especially as the idea of the immaterial emerges, the "divine" is separated off and with Aristotle becomes, not a part of nature, but that which "encloses the whole of nature". This phrase refers, as I take it, to the sphere of the First Heaven, which encircles the world.

Greek philosophy of nature begins with the divine. It also ends with the divine. In the system of the Stoics the divine *pneuma* is the soul of the world. To call Thales a "philosopher, who has quietly rejected all the myths about the gods and theogonies" is to violate the spirit of the whole Ionian tradition. We may, if we

[3] *Meta.* 1074b 1 *seq.* All of the quotations from Aristotle that appear in this essay are taken from the Oxford translation.
[4] *Ibid.* 1072b 14.

like, say that Thales adopted a naturalistic type of explanation, for water is certainly one of the visible elements of the natural order, but when we remember that the word *physics* is suffused with meanings that cut across all dualisms, we may just as well say that his explanation is supernatural. When we speak of the Greeks as naturalists, we must remember that for them nature is Substance, Life, Power, Soul, and God. When they thought of *physis* as divine, the word carried the meaning of a master concept, the concept of an impersonal power, eternal and imperishable, capable of generating out of its own assertive energy all the things that come to be.

5. Nature is Value. Natural power is so conceived that it is everywhere worthy of trust. Fidelity to nature is the essence of the Greek spirit. Nature is the model of all excellence and the pattern of all perfection. Thus Purpose, Law and Value have a natural basis. All distinctions between higher and lower, better and worse, are drawn in strict conformity with antecedent demarcations. According to Heraclitus, the dry soul is not only *wisest*, but is also *best*.

The Greek liked his world neat. Nothing offended him more than seeing things out of place. Rightness of place was grounded in the order of natural happenings. Things are in place when they are where nature intended they should be. Nature sifts, arranges and distributes things in her own way, and nature's way is the right way. Effrontery, the cardinal Greek vice, consists in overstepping one's natural limit. In Plato the lines of cleavage that mark the bases for definition and division, the ordering of classes in society, the distinction between the parts of the soul, the hierarchy of pleasures and of intellectual operation and of kinds of being, are drawn in accordance with nature. This view is so characteristic of Aristotle that Santayana has expressed his metaphysics in a simple brilliant formula: "Everything ideal has a natural basis, and everything natural has an ideal fulfilment." That nature is a vehicle of Value as well as of Power is the foundation of the Stoic doctrine of life "according to nature". I have no doubt that Stoic metaphysics is a continuation of the older Greek view of nature as a moral, purposeful, rational, divine order.

With this general statement of the meaning of nature, let us

now turn to the extant records. I shall select for illustration Hesiod, Thales, Anaximenes, Heraclitus and Aristotle. It is my belief, however, that allowing for such modifications as we should naturally expect from a people as intellectually active as the Greeks, the whole of Greek thought adheres to certain very general attitudes and conceptions. I believe this to be true specifically of Ionian thought, and in a general way of Pythagoras, Plato and Democritus, although I shall not be able to include them in this paper.

The earliest recorded beginnings of natural philosophy among the Greeks are found in the cosmology of Hesiod. The following is a brief summary.

At the very beginning (*protista*) Chaos was. At the foundation of things lies a simple, impersonal, natural existence, Chaos, the yawning abyss.

And then (*autar epeita*) Earth was, and Tartarus and Eros (Love). Of the relation of these natural existences to Chaos, nothing can be asserted other than chronological sequence. The text does not warrant the inference that Earth, Tartarus and Eros were produced *out of* Chaos. Whether, therefore, we are to assume one cosmogenetic principle, or four such principles, cannot be determined. Hesiod evinces no interest in the controversy that subsequently arose between monism and pluralism. What is certain is that at least three of the above-mentioned existences become cosmogenetically active.

Out of Chaos (*ek Chaeos*) came Erebus and Night. Chaos is here viewed as a generative reality capable of producing out of itself other natural existences. These derivative substances are in turn productive of other physical realities. From the marriage of Erebus and Night spring Aether and Day. From Earth came Heaven, the mountains, and the sea, and subsequently from the marriage of Earth with Heaven came Oceanus, the deep-swirling river that encircles the earth.

The later portions of the Theogony deal with the generation of various personified forces and with the genealogy of the personal gods.

In this brief outline of Hesiod the one *all-important* point to

note is the distinction between cosmology, dealing with the generation of the physical forces and realities of nature, and theogony, dealing with the genealogy of the personal gods. Cosmology *precedes* theogony. The Olympian gods did not create the world. They govern the world *after* it has been created by natural forces. The natural world is *older* than the gods who rule it. This is a view from which subsequent Greek thought never departed. I know of no Greek thinker who ever held to a doctrine of divine creation *ex nihilo*. The priority of natural existences to the rule of the gods was noted by Aristotle: "And the old poets agree with this inasmuch as they say that not those who are first in time, e.g., Night and Heaven or Chaos or Ocean, reign and rule, but Zeus."[5]

We may now pass to the philosophers. The task which the Ionians set for themselves was twofold. It was, in the first place, to say what "nature" was. The first philosophers did not discover "nature". They all knew in a general way that "nature" was the divine source of power, life and movement. What the early philosophers did was to identify "nature" with some particular and definite thing and thus to give to it a concrete definition. Thales said it was "water". Anaximenes said it was "air". Heraclitus said it was "fire". Although they differ as to what the cosmogenetic principle is, they agree that it is divine, self-active and endowed with the power of generating out of itself "all the heavens and all the worlds within them". Thus Aristotle: "If we look at the ancients, physics would seem to be concerned with the *matter*."[6] "Consequently, some assert earth, others fire or air or water or some or all of these, to be the nature of the things that are. . . This then is one account of 'nature', namely that it is the immediate material substratum of things which have in themselves a principle of motion or change."[7] I think there can be no doubt that Aristotle is right in interpreting the "nature" of the early Greek philosophers as a material cause, but we must not fail to ascribe to this originative substance all the fructifying and generative powers consonant with absolute power, vitality, mentality and divinity. The explanation of every physical change is vested in the inherent capacities of material substance.

[5] *Meta.* 1091b 4. [6] *Phys.* 194a 20. [7] *Ibid.* 193a 21 *seq.*

The second task is to describe the cosmogenetic process. The details will differ in accordance with the limitations imposed by the selection of a generative substance. All of the Greeks are agreed in the belief that the world has passed through a process of cosmic evolution. With the interest of men of science, although at a time before science had become detached from religion, they speculate about what has happened in the course of world-evolution. What they do is to begin with one or more cosmogenetic substances and proceed to describe in broad and general terms the processes by which the world and all that it contains has come into being. The anthropomorphic gods disappear. Their place is taken by "water", "air", or "fire", but these "natural" substances have all the attributes of the ancestral gods. They are impersonal divinities. Is the outcome natural "science" or "theology"? It is neither, and it is both. It is a practical repercussion of theology, and a speculative anticipation of science.

Thales said that "water" is the principle of things. Water, therefore, is to be identified with "nature". We have only to ascribe to it the qualities already assigned to "nature" to render the meaning clear. Water is the living substance of which all things consist. All physical, vital and psychical phenomena are grounded in the natural possibilities of water. As anyone who observes a downpour of rain may see, water moves itself. What moves itself has soul in it. Soul, therefore, is diffused throughout the universe. The gods disappear, but "nature" is "divine".

"Just as our soul being air holds us together, so do breath and air encompass the whole world." This fragment from Anaximenes expresses a theoretical point of view which persisted throughout the whole of subsequent Greek thought. What is here expressed in broad and comprehensive language is the speculative hypothesis that both man and nature are subject to the same animating and vivifying forces. The imaginative vision of the essential unity of man and nature more than any other single idea inspired the whole of Ionian thought.

The Greek conception of "nature" is further clarified in the cosmology of Heraclitus. Fire is the first principle. It is a divine substance endowed with every power necessary for cosmogenesis. The details of the Heraclitean cosmology are too well known to

be repeated here. However, there is one point that should be mentioned. The maintenance of balance in the process of give and take gives rise to the concept of law and order. All change is orderly change; all transition is measured transition; all opposition is balanced opposition. Thus law, order and harmony are grounded in the objective order of nature.

The psychology of Heraclitus is inseparably bound up with his cosmology. The drama of physical change is re-enacted on the stage of human life, thus repeating in the human soul the operations that occur in the physical world. The same force that penetrates all matter manifests itself in man. Nature's psyche and man's psyche are the same. The soul of man is a fragment of the universal fiery energy that appears in the universe at large. Man is the universe in miniature. Evaporations and exhalations have their counterpart in the meteorology of the soul.

One remark should be made that applies not only to Heraclitus but to Greek psychology in general. Explanation of psychological phenomena consists merely in a description of the conditions under which perception takes place. So far as I know, no Greek undertook to explain consciousness. Psychology consists in the effort to place the elementary facts of perception and cognition in an intelligible connection with the antecedent conditions with which they are continuous.

Perception is, therefore, a natural event. The energies of thought are identical with the energies flowing through the universe. The organs of sense are the instruments by which these energies are utilized for cognitive purposes. Just as man in the vital act of respiration is in physical relation to an atmosphere which envelopes and sustains him, so in the rational act of perceiving and knowing he is in relation with the substance of reason which permeates the objective order of nature. Reason is identified with fire. Man lives a rational life just to the extent that the fiery element enters into him. Wisdom is lusty living; stupidity is a mark of low vitality. Thus all humanistic distinctions are distinctions which follow lines already drawn in "nature".

"The dry soul is wisest and best." Both knowledge and virtue are meteorological phenomena. "It is pleasure to souls to become moist." Pleasure arises at that point at which the fire of the soul is

transformed into moisture. This transformation involves a degradation of being—consequently pleasure is qualitatively inferior to intellect. "It is death to souls to become water." What is here expressed, I think, is the distinction between the animate and the inanimate. There is no psyche in water or earth. They are essentially without the power of self-movement, while fire, on the other hand, is all mobility. No Greek ever identified *physis* with earth. "Souls smell in Hades." In these parts the pure fire of heaven has been transformed into fumid exhalation. Being impure they have sunk to the lowest regions. Under these conditions "smelling" is the only form of contact with an external reality.

We now pass to Aristotle's view of nature. His philosophy of nature is the crowning work of Ionian science. "All the things [which exist by nature] present a feature in which they differ from things which are *not* constituted by nature. Each of them has *within itself* a principle of motion and of stationariness."[8] That is to say, whatever possesses an innate impulse to change belongs to the class of things which exist by nature. No artificial object is self-producing. Hence nature is defined as *"a source or cause of being moved and of being at rest in that to which it belongs primarily."*[9] Nature is not a substance, but substance has a nature. Nature always implies a subject in which it inheres. Consequently, according to Aristotle, all of his predecessors who had identified "nature" exclusively with one or more of the material elements, were wrong. "Nature" is the principle of law, organization, and production of all those physical things which fall within the sphere of change and becoming. "Nature" is not a thing, but things operate "according to nature".

Perhaps no simple words better summarize Aristotle's conception of nature than the word "power". An analysis of nature is an analysis of power. Power is a better word than force because force carries a modern meaning, a meaning that is likely to vanish into a mathematical formula. Aristotle is above all a physical realist. Anyone may understand his physics who possesses the simple-minded faculty of hypostatizing abstractions. Every primary principle is a *causa essendi*. Consequently scientific

[8] *Phys.* 192b 12. [9] *Ibid.* 192b 22.

method consists in an advance "from what is more obscure by nature, but clearer to us, towards what is more clear and more knowable by nature".[10]

The problem of physics is the problem of understanding how power operates. Let us first consider its operation in the realm of the inorganic. Power cannot be reduced to a single principle. No form of physical monism is tenable. To posit one originative principle is to deny the possibility of science. We must as physical scientists become pluralists. But pluralism takes many forms. Most of the pre-Aristotelian pluralists have reduced their primary principle to two which they set forth in terms of the traditional "contraries". But dualism is likewise untenable, "for it is difficult to see how either density should be of such a nature as to act in any way on rarity or rarity on density. The same is true of any other pair of contraries."[11]

Power is reducible to motion. If one does not understand motion, says Aristotle, he cannot understand nature. The reduction of power to motion suggests materialism and mechanism. But neither of these views, according to Aristotle, is able to give any satisfactory account of change and becoming. Change in any real sense involves an absolute qualitative transformation of material. The operation of power must be so conceived that such ultimate qualitative change is possible. It is here that Aristotle departs widely from Plato. Plato had started in the direction of mathematical physics, and attempted to reduce all quality to the mathematical properties of the elements. In Aristotle quality has the same metaphysical status as quantity, and so far as a philosophy of nature is concerned, is of greater explanatory value. The "rare" and the "dense", the "heavy" and the "light", the "dry" and the "moist" are fundamental concepts in physical science. In the operation of power things borrow and lend their detachable qualities. Change is a qualitative exchange and is, therefore, one of nature's operations.

The primacy of quality as a scientific point of departure, the transformation of the elements from one form into another, the rejection of atomism and mechanism, and the affirmation of pur-

[10] *Phys.* 184a 20. [11] *Ibid.* 189a 22.

pose as an ultimate concept of scientific explanation, are the outstanding features of Aristotle's philosophy of the inorganic.

Let us now turn to his conception of life and mind. His treatise on *Meteorology* opens as follows:

> We have already discussed the first causes of nature, and all natural motion [*i.e.*, the *Physics*], also the stars ordered in the motion of the heavens [*i.e.*, the *De Caelo*], and the physical elements—enumerating and specifying them and showing how they change into one another—and becoming and perishing in general [*i.e.*, the *De Gen. et Corr.*]. There remains for consideration a part of this inquiry which all our predecessors called meteorology. . . . When the inquiry into these matters is concluded let us consider what account we can give, in accordance with the method we have followed, of animals and plants, both generally and in detail. When that has been done we may say that the whole of our original undertaking will have been carried out.[12]

From this passage it is perfectly evident that biology and psychology are to be treated as parts of the general philosophy of nature. Physics, astronomy, meteorology, psychology and biology are all parts of a single inquiry and are treated by a common method of investigation. Aristotle's philosophy of nature supplies the details of the general speculative anticipation of Anaximenes, namely, that psychology and cosmology have a common basis. Taking Ionian science as a whole, one of its outstanding traits is the persistent attempt to incorporate the philosophies of life, mind and nature within a single type of inquiry, and to explain the three modes of being in terms of the same fundamental principles.

Let us now see how biology and psychology are treated as parts of a single order of natural existence. It cannot be said that all nature is alive. The four elements are not living bodies, and there are many inorganic bodies compounded of the elements.

What distinguishes living from non-living things is the presence in them of soul. If we leave out of account the active intellect in man, which is most certainly not a part of nature, all of the remaining functions of the soul fall within the field of natural science. Just why the active intellect should be viewed as something which "comes in as through a door from without", I cannot say. It would be my guess that Aristotle wishes to identify the highest part of the soul with the "divine". In so far as the rational soul

[12] *Meteor.* 338-339a.

is "divine", man can, in the exercise of reason, imitate the life of God.

But let us return to Aristotle's biology and psychology. How are life and mind viewed as parts of "nature"? Each individual living thing is a substance. Every substance *has* a nature, an inner directing power that governs every change. Soul is the nature of living things. It is that according to which every animate existence displays its activity. Soul is the power behind every vital activity—nutrition, growth, sensation and thought. Vitality is the power which soul communicates to body; all living functions are enmattered powers.

This may be expressed in another way. Every substance has a dual aspect. It is a combination of matter and form. The reason we pronounce certain conformation of materials "living" is because "form" at that stage of embodiment exhibits superior directing power. It is the business of the physicist to study enmattered form wherever he finds it. Any separation of matter and form, where they are inseparable in existence, leads to abstraction. I should like to quote a passage from the *De Anima* which seems to me to be of tremendous significance.

> Consequently their definitions ought to correspond, e.g. anger should be defined as a certain mode of movement of such and such a body (or part or faculty of a body) by this or that cause and for this or that end. That is precisely why the study of the soul must fall within the science of Nature, at least so far as in its affections it manifests this double character. Hence a physicist would define an affection of soul differently from a dialectician; the latter would define e.g. anger as the appetite for returning pain for pain, or something like that, while the former would define it as a boiling of the blood or warm substance surrounding the heart. The latter assigns the material conditions, the former the form or formulable essence; for what he states is the formulable essence of the fact, though for its actual existence there must be embodiment of it in a material such as is described by the other. Thus the essence of a house is assigned in such a formula as "a shelter against destruction by wind, rain, and heat"; the physicist would describe it as "stones, bricks and timbers"; but there is a third possible description which would say that it was that form in that material with that purpose or end. Which, then, among these is entitled to be regarded as the genuine physicist? The one who confines himself to the material, or the one who restricts himself to the formulable essence alone? Is it not rather the one who combines both in a single formula?[18]

[18] *De Anima* 403a 25 *seq.*

From this passage it is clear that psychological phenomena are expressions of form embodied in matter. Sensation and emotion are modes of movement which differ from other forms of movement only in their superior definiteness of purpose. The Greeks had no word in their language capable of expressing the idea of will. *Voluntas,* which occurs so frequently in Latin, is a Roman conception, but not Greek. This is significant. Aristotle's psychology is what we should call behavioristic. The idea of will implies a non-natural power capable of influencing natural movement from without. To formulate such a conception would be fatal to the whole Aristotelian point of view. It would destroy the unity of man and nature. I suspect that dualism has its origin partly in the psychology of will and is traceable on the one hand to the Roman emphasis upon *Voluntas* as a quality of character and on the other to the Christian emphasis upon choice as determining the destiny of the soul.

Modern thought has departed widely from the Aristotelian conception of the essential unity of man and nature. Descartes set up a dualism with physics on the one side and psychology and logic on the other. It is essentially a dualism between mechanical and purposeful activity. Following Descartes we have given the physicist the exclusive right to define nature, leaving the psychologist and logician to deal with what the physicist rejected. When this dualism has been rigidly applied, physics has become a skeleton, psychology the miracle of immaculate conception, and symbolic logic a mere menu card. And we say that Aristotle ruined science. Is it not rather that science ruined Aristotle?

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EXPERIENCE AND MEANING*

EVER since the provisional skepticism of Descartes' First Meditation the attack upon any problem of reality has always been shadowed by the question "How do you know?". The extent to which this perennial challenge has determined the course of modern philosophy requires no exposition. That on the whole the results of it have been salutary will hardly be denied; though it may be said—and has been said—that it leads, on occasion, to the confusion of methodological considerations with positive conclusions. The last thirty-five years have witnessed a growing emphasis upon another such challenge, which bids fair to prove equally potent in its directing influence. This is the question "What do you mean?", asked with intent to require an answer in terms of experience. That is, it is demanded that any concept put forward or any proposition asserted shall have a definite denotation; that it shall be intelligible not only verbally and logically but in the further sense that one can specify those empirical items which would determine the applicability of the concept or constitute the verification of the proposition. Whatever cannot satisfy this demand is to be regarded as meaningless.

For any sufficient consideration of this empirical-meaning requirement it would be essential to sketch those developments which have brought it to the fore: pragmatism and the "pragmatic test"; neo-realism, both of the American school and the similar view of Russell; the new methodology in physics which came in with relativity, especially Einstein's treatment of definition and Bridgman's operational theory of the concept; Whitehead's method of "extensive abstraction", by which certain previously refractory concepts can now be defined in terms of the actually observable and their empirical content thus made evident. Last and most particularly, one would mention the logical positivism of the Vienna Circle, whose program is based throughout upon this consideration of empirical meaning. It would likewise be desirable to consider the divergences between these different movements of thought in their interpretation of the general requirement of empirical meaning.

* The presidential address to the eastern division of the American Philosophical Association at Amherst College, December 29, 1933.

But before this audience it will be unnecessary to attempt any such survey, either of this development in current theory or of the points of divergence with respect to it. Taking these matters for granted, the purpose of what follows will be to explore a little certain questions concerning the limitations imposed upon significant philosophic discussion by this requirement of empirical meaning; in particular certain issues which are likely to divide those who approach these problems with the thought of James and Peirce and Dewey in mind from the logical positivists. The ultimate objective of such discussion would be to assess the bearing of this limitation to what has empirical meaning upon ethics and the philosophy of values, and upon those metaphysical problems which concern the relation between values and reality. But that objective cannot be reached in the present paper, which will be concerned with prior questions. Even these cannot be set forth with any thoroughness; and I hope it will be understood that the purpose of this discussion is to locate issues rather than to dispose of them, and that criticisms ventured are not put forward in the spirit of debate.

The Vienna positivists repudiate all problems of traditional metaphysics, including the issue about the external world supposed to divide idealists from realists, and any question concerning the metaphysical character of other selves. In the authoritative statement of their position we find the following: "If anyone assert 'There is a God', 'The ground of the world is the Unconscious', 'There is an entelechy as the directing principle in the living', we do not say to him 'What you assert is false' but instead we ask him 'What do you mean by your statement?'. And it then appears that there is a sharp line of division between two kinds of propositions. To the one belong statements such as those made in the empirical sciences: their meaning can be determined by logical analysis; more specifically, it can be determined by reduction to statements of the simplest sort about the empirically given. The other class of propositions, to which those mentioned above belong, betray themselves as completely empty of meaning, if one take them in the fashion which the metaphysician intends. . . . The metaphysician and the theologian, misunderstanding themselves, suppose that their theses assert something, represent mat-

ters of fact. Analysis shows, however, that these propositions assert nothing, but only express a sort of feeling of life."[1] According to Carnap all value-theory and normative science are likewise without meaning, in the theoretical or empirical sense of that word.[2]

The expression of such feeling of life, and of our evaluative reactions, is, of course, admitted to be a legitimate and worth-while activity; but, as such expression, metaphysical theses are to be classed with art and poetry. Obviously there is room in such a theory for descriptive ethics, on a psychological or sociological basis, and for the determination of values by reference to a norm which is assumed or hypothetical; but traditional questions of the 'objectivity' of value are repudiated. We may meaningfully ask "When is a character judged good?" or "What is actually approved?", but not "With *what right* is this character said to be 'good'?" or "What is absolutely *worthy* of approbation?".[3]

This repudiation of metaphysics and normative science by the logical positivists cannot, I think, be regarded as an implication of the empirical-meaning requirement alone. At least an important light is thrown upon it by taking into account that "methodological solipsism" in accordance with which their program is developed. Even though they regard this procedure as advantageous rather than prescribed, still the negations or limitations which characterize it seem to underlie their theses, in whatever terms expressed.

On its constructive side this method means no more, at bottom, than a persistent attempt so to define the different classes of objects of our knowledge that the basis of this knowledge in direct experience will be exhibited. It is of the essence of knowledge that it is in the first person. Your mind and your experience can be nothing more, for my cognition, than a construction which I put upon certain data of my own experience. If, then, we are to have a thorough and completed account of knowledge, it is not sufficient that the constitution of objects known should be traced back

[1] *Wissenschaftliche Weltauffassung des Wiener Kreises* (1929) 16. (I have translated somewhat freely.)

[2] "Auf dem Gebiet der Metaphysik (einschliesslich aller Wertphilosophie und Normwissenschaft) führt die logische Analyse zu dem negativen Ergebnis, dass die vorgeblichen Sätze dieses Gebietes gänzlich sinnlos sind." "Überwindung der Metaphysik durch logische Analyse der Sprache", *Erkenntnis* II (1931) 220.

[3] See M. Schlick. *Fragen der Ethik*, esp. I 8 pp. 10-12.

to experience in the merely generic sense. So far as your observations and reports enter into the construction of that reality which is known to me, they can do so only through the interpretation which I put upon certain modes of your behavior perceived by me. Actually given experience is given in the first person; and reality as it is known in any case of actual knowledge can be nothing, finally, but a first-person construction from data given in the first person.

Consonantly, we have such construction of the objects of science in general as is outlined in Carnap's *Logischer Aufbau der Welt:* first, the different kinds of for-me entities (*eigenpsychische Gegenstände*) which are constructed out of elementary experiences (*Elementarerlebnisse*), at bottom, through the relation of remembered similarity (*Ähnlichkeitserinnerung*); second, physical objects, which are constructions out of the simpler for-me things of actually given experience; third, other selves and the mental or cultural in general (*fremdpsychische und geistige Gegenstände*), which are, for actual knowing, constructions out of certain classes and certain relationships of physical things and processes.

In this program we have a consistently maintained effort to be true to the nature of knowledge as we find it. The egocentric predicament is taken seriously; and the "solipsistic" character ascribed to knowing is no more strange or fantastic than Kant's transcendental unity of apperception. The manner in which the *negative* side of logical positivism is related to this same method may, perhaps, be more readily appreciated by reference to cruder but somewhat parallel considerations which are suggested by Berkeley's argument against material substance. (It was Berkeley who first adduced the requirement of empirical meaning in order to prove his opponent's concepts empty and non-significant.)

As has often been noted, the significance and applicability of Berkeley's argument does not leave off at the point where he ceases to use it. By identical logic other selves and the past and future must go the same way as material substance. If you are more than one of my ideas, how can I know it? How can I consistently suppose that I even have an interest in that untouchable you outside my mind which *ipso facto* could make no difference in my experience of you? Also, at this moment, what is that past which I remember, as more than the present recollection, or the

future as more than the present experience of anticipation? All must finally dissolve into the eternal now of actually given experience.

There is even one further step for this logic to take. What am I? This self as a recognizable or conceivable particularity can be no more than one of those ideas I call mine. And Wittgenstein gives indication that he accepts the parallel methodological implication: "The subject does not belong to the world but it is the limit of the world. *Where in* the world is a metaphysical subject to be noted? You say that this case is altogether like that of the eye and the field of sight. But you do *not* really see the eye. And from nothing *in the field of sight* can it be concluded that it is seen from an eye. . . . Here we see that solipsism strictly carried out coincides with pure realism. The I in solipsism shrinks to an extensionless point and there remains the reality coördinated with it."[4]

I must not convey the impression that the logical positivists use Berkeleyan arguments, or that they arrive at their conclusions by such a train of thought as the above. Nevertheless this may serve to suggest how methodological solipsism comports with a thoroughgoing empiricism; and it further suggests why this procedure is to be taken as having no metaphysical implications. Subjective idealism, consistently carried through, ends by qualifying every substantive with the prefix "idea of" or "experience of", which by being thus universal becomes meaningless. Whereas Berkeley supposes his argument to establish a subjectivist metaphysics by proving the realistic metaphysics to be empty of empirical meaning, logical positivism points out that the contrary of a meaningless assertion is likewise without meaning, and hence repudiates metaphysical theses of both sorts, and the issue itself, as nonsignificant. Three points, here evident, contain, I think, the gist of the matter. First; when knowledge is envisaged, as it must be, from within the egocentric predicament, all objects known or conceived must reveal themselves as constructions, eventually, from data given in first-person experience. Also, what enters into such construction from past experience can only come in by way of present recollection. (This last is, I take it, the reason for the basic

[4] *Tractatus Logico-Philosophicus*, pp. 151-153. *Cf.* Carnap, *Logischer Aufbau der Welt* §65.

position of the relation of remembered-similarity in the program of Carnap.) Other selves and their experience, or their reports, can enter only as certain items of first-person experience upon which a peculiarly complex construction is put. Second; distinctions such as that between real and imaginary, or between that which is apprehensible to me alone and the object apprehended by us in common, must nevertheless find their genuine place and importance in such construction. The fact that we make these distinctions in practically useful ways evidences that they are not outside the egocentric predicament and metaphysical but inside it and empirical. They are determined by criteria which the subject can and does apply within his own experience. Berkeley, for example, offered the criterion of independence of my will as the basis for the distinction of real from imaginary. And in Carnap one finds such distinctions, and their empirical criteria, meticulously examined. Third; metaphysical issues concerning the external world and other selves do *not* turn upon such empirically applicable distinctions as those just referred to, which can be applied within first-person experience. Such metaphysical issues can arise only as it is attempted to give some second meaning to the concepts involved; meanings which do not answer to any empirical criteria which the subject can apply within his own experience. Throughout, a particular and critical point is that only first-person (*eigenpsychische*) data of experience are allowed, in the end, to enter into the construction of objects of knowledge or to function as the empirical content of any meaning.

There is, I think, one further question which is crucial for any theory of knowledge; namely, the question of immediacy and mediation, or transcendence. This has a connection with the preceding considerations; but with respect to this further problem I cannot satisfy myself that I elicit any complete and clear pronouncement from the literature of logical positivism. One can pose the principal issue involved by reference to a statement of Russell's: "Empirical knowledge is confined to what we actually observe."[8] This may seem to be a truism; but I think it is in fact

[8] *Our Knowledge of the External World* 112. The author makes this statement quite in passing, and perhaps without having in mind the point with which we are concerned.

thoroughly false, and demonstrably incompatible with the very existence of empirical knowledge. Let us impose this limitation quite rigorously, in conformity with the considerations set forth above. Knowledge is always in the first person; whatever is known must be known to the subject in question, at the actual moment, within his own experience. The experience of others can enter only as certain items of their subject's own—their reports and behavior perceived by him. And the experience of yesterday or tomorrow can figure in this knowing only as it enters, in the form of memory or imagination, into experience here and now. Hence nothing can be known but what is verifiable in the subject's own experience at the moment when the knowing occurs.

Similarly for meaning. Suppose it maintained that no issue is meaningful unless it can be put to the test of decisive verification. And no verification can take place except in the immediately present experience of the subject. Then nothing can be meant except what is actually present in the experience in which that meaning is entertained. Whatever runs beyond this is unverifiable, and hence meaningless. The result of any such train of thought is obvious; knowledge would collapse into the useless echo of data directly given to the mind at the moment, and meaning would terminate in the immediate envisagement of what is meant.

This is a reduction to absurdity of both knowledge and meaning.[6] If nothing can be known but what is literally within the cognitive experience itself, and what is meant can be only that which is present in the experience which is the bearer of that meaning, then there is no valid knowledge and no genuinely significant meaning. Because the *intention* to refer to what transcends immediate experience is of the essence of knowledge and meaning both. Berkeley himself tacitly recognized that, in noting that one idea is "sign of" another which is to be expected; even the skeptic recognizes this intent of knowledge—he is skeptical precisely of

[6] In order to avoid confusion with a quite different problem, the distinction between meaning in the sense of denotation and meaning as connotation should be in mind. It is only the former meaning of "meaning" which is in point in this discussion. In the classification of logical positivism meanings are (1) structural, as in logic and mathematics, or (2) empirical, as in natural science, or (3) emotive, as in art and poetry. It is meaning in sense (2) which is concerned here.

the possibility that what is *not* immediate can be known. If that intention of transcendence is invalid, then the further characters of knowledge and of meaning are hardly worth discussing.

Neither the logical positivists nor anyone else (unless a mystic) intends this reduction to absurdity. But if it is something which has to be avoided by any theory which is compatible with the genuine validity of knowledge, that fact becomes important for the just interpretation of the requirement of empirical meaning. In particular, it becomes evident that the experience in terms of which a cognitive meaning requires to be explicated cannot be exclusively the subject's own given data at the moment of the cognition. Thus that manner of reading the implications of methodological solipsism which is suggested above would condemn that procedure to futility. If what the method requires is that objects known should be constructed or defined exclusively in terms of sense-data actually given to the subject at the moment when the knowing takes place, then that method is incompatible with the possibility of knowledge and the reality of empirical meaning.

We are here faced with a problem which runs through the whole history of post-Kantian epistemology—though it is Berkeley rather than Kant who precipitated it in its modern form. How can the knowledge-relation, or the relation of idea to the object it denotes, be valid unless what is known or meant is present to or in the experience which knows or means? But if what is meant or what is known is merely the cognitive experience itself, or something in it, then how can either knowledge or meaning be genuine?

In general there are three types of solution which have been offered. The first of these is representationalism, according to which the object never literally enters into the experience of the subject. This view recognizes, in at least one sense, the transcendence of the object known or meant; and thus avoids the reduction to absurdity which has been mentioned. The difficulty of this view is, of course, to reconcile such transcendence of the object with the possibility of knowing it. Second, there are identity-theories, both idealistic and realistic, according to which the

object, or the object so far as it is known, is identical with some content of the subject's experience at the moment when the knowing takes place. The outstanding difficulty of this view is to avoid the reduction to absurdity, because it is incompatible with the supposition that anything can be known which lies beyond the immediate experience of the knower.[7] Such identity-theories are also liable to difficulty with the problem of error.

For the third type of theory—which includes both objective idealism and pragmatism—the object known is definable or specifiable in terms of experience, but the experience in terms of which the object is thus definable is not, exclusively, the experience of the subject at the moment of knowing; it transcends that experience. In rough general terms, objective idealism takes this relation between the experience in terms of which the object is specifiable and the experience which cognizes, to be the relation of something *deductively* implied to that in which it is implicit. That is, the present experience in which the knowing occurs—the idea or the given—is taken as determining implicitly the whole object in its reality, and as determining it unambiguously and with certainty, if only we could be explicitly aware of all that is implied. In equally rough terms, pragmatism may be said to take this relation as *inductive;* the given experience of the moment of knowing is the basis of a probability-judgment concerning the experience (or experiences) which would verify, and in terms of which the real nature of the object is expressible.

It would probably be incorrect to take the logical positivists as holding an identity-theory of the cognitive relation.[8] But if they do not, then their conception of the object known, as constructed or 'constituted' in terms of given sense-data, requires to be interpreted so as to avoid an ambiguity which is possible. At this

[7] For an identity-theory of the realistic variety, the object known may transcend the knowing experience—because it is known only in part—but the object so far as it is genuinely cognized cannot.

[8] There could be doubt; for example, Carnap says, "Between 'concepts' and 'objects' there is only a difference in the manner of speech" (*Logischer Aufbau der Welt*, Zusammenfassung, p. 262); and their conception of the relation between physical and mental might be taken to argue an identity-theory. But they have, I think, been principally absorbed in the problem of the *analysis* of the concept (or the object as an intellectual construction), and one should be chary of attempting to elicit from their writings any answer to the present question, which is of a quite different order. At least, I should not wish to presume to do so.

moment I am thinking of the wall behind my back. If I should turn around, I could verify my idea of it. But if at this moment I refer to the wall as a construction from presently given data, then the distinction between 'construction' as present concept, and 'construction' as that which this concept means to denote, is essential. Both are empirical data, if you like—but they are not the same data. The data which have their place in the concept are memories, visual and tactile images, anticipations; the data which would verify this conception would be perceptions. Not only are memories, ideas of imagination, and perceptions different events, but they are empirically distinguishable kinds of experience-content. Either, then, the wall which my idea denotes is merely the imagination-wall or recollection-wall, which is the immediate datum; or I cannot at this moment know the real wall which I mean; or—the third possibility—it is false that what I now know and mean by 'the wall' coincides with any complex of sense-data now in my mind.

It is on this point that the third type of theory is significant. For the pragmatic form of this third type knowing begins and ends in experience; but it does not end in the experience in which it begins. Hence the emphasis on the temporal nature of the knowing process, the leading character of ideas, and the function of knowledge as a guide to action. Knowing is a matter of two 'moments', the moment of assertion or entertainment and the moment of verification; both of these moments belonging to experience in the generic sense of that word. Knowledge will be true or correct only in so far as the present experience—of the entertainment of the meaning—envisages or anticipates correctly the experience or experiences which would verify it; that is, our knowledge is true if the anticipated experience is genuinely to be met with. But the entertaining experience can be truly cognitive, as against a mere enjoyment of itself, only by the fact that what would be realized in the moment of verification is distinct from the experience which entertains or anticipates it. Otherwise error would be impossible—one cannot be mistaken about the immediate—and hence knowledge, as the opposite of error, would likewise be impossible. I do not mean to say, of course, that at the moment when something is believed or asserted it cannot have a ground in

given experience, or be 'partially verified'; but it *is* meant that there must be something more, which is believed in or asserted, than what is verified immediately, if the experience is to have the significance of a knowing as contrasted with an esthetic enjoyment.

The same point can be phrased in another way by reference to the question whether, and in what sense, the datum, by means of which any item of reality is known, is distinct in its being from the cognoscendum.[9]

I should urge that any identity-theory which denies this difference between datum and cognoscendum is incompatible with the cognitive function of the idea or datum. This cognitive function is the guidance of behavior; and in order that the cognizing experience may perform this function there must be at least an element of anticipation or implicit prediction which foreshadows what is *not* here and now present in the datum.

For certain types of realism the problem thus set is taken to be that of the relation between data as items of experience and the reality in its independent existence, which is not any item or complex of items in experience. Pragmatism, in common with idealism and with logical positivism, repudiates the problem in this form as unreal.[10] For all three of these views the relation of datum to cognoscendum is taken to be a relation within experience (in the generic sense), or between one experience and others; not a relation between something in experience and something altogether out of it. The reasons for this attitude would be different in each case; but for all three views the principal ground of this repudiation is the obvious one that a relation of experience to what cannot be brought within experience is a relation which cannot be investigated, and one the very conception of which as cognitive involves a confusion of thought.

All three of these theories would agree that the cognoscendum

[9] I borrow this formulation from the recent discussion of Strong and Lovejoy in the pages of *The Journal of Philosophy*, XXIX (1932) 673-687 and XXX (1933) 589-606.

[10] There may be doubt of this. I do not affirm it dogmatically; but this seems to express the intent of Dewey's denial of "antecedent reality", James's insistence that a thing is what is "known as", and Peirce's pronouncement that our concept of the effects of an object, which have practical bearings, exhausts our whole concept of the object.

must be defined, or constructed, or constituted for knowledge, in terms of experience. But if we are not to fall into the opposite error of the reduction to absurdity, which comes from identifying datum and cognoscendum, it must be recognized that the experience of knowing and the experience in terms of which the object is specified cannot be simply identical.

The very simple point which is pertinent to the further issues of this paper is the fact that although knowledge is subject to the here-and-now predicament—the data must be immediate—it is essential to the cognitive function of the present experience that its cognoscendum should *not* be merely here and now. If, for example, there can be knowledge of a future event in one's own life, then the datum which is the vehicle of this anticipation is not the anticipated cognoscendum. And in so far as all empirical knowing has the dimension of anticipation or implicit prediction, the thing known is not to be identified with, or phrased exclusively in terms of, here-and-now experience. What is known now, *now* has the status of being verifi*able*; but in the nature of the case it does not and cannot have the status of being verifiable-now.[11] The only thing which is literally and completely verifiable-now is that which is immediate and now-verified.

This account is, of course, hopelessly inadequate, and raises all sorts of questions which cannot be dealt with here. But the points which are directly pertinent to the further discussion are these. (1) The conception that "empirical knowledge is confined to what we actually observe" is false. To know (empirically) is to be able to anticipate correctly further possible experience. If this is not the whole significance of such knowing, at least it is an essential part of it. (2) What is anticipated, known, or meant must indeed be something envisaged in terms of experience—the requirement of empirical meaning stands. But equally it is essential that what is empirically known or meant should *not* be something which is immediately and exhaustively verified, in what I have called the moment of entertainment.

It will also be of importance to consider a little the sense, or

[11] We use the expression "verifiable now" oftentimes in the sense of "verifiable at will". That means literally "verifiable the next moment if I choose to meet certain understood conditions".

senses, of the word 'verifiable'. Like any word ending in 'able', this connotes possibility and hence connotes conditions under which this possibility is supposed to obtain. To advance the dictum that what is empirically known, and what is meant, must be verifiable, and omit all examination of the wide range of significance which could attach to 'possible verification', would be to leave the whole conception rather obscure. But instead of attempting here some pat formulation *a priori*, let us briefly survey different modes of the 'possibility' of the verifying experiences projected by meaningful assertions.

At this moment I have a visual presentation which leads me to assert that my watch lies before me on the table. If what I assert is true, then I could touch the watch, pick it up, and I should then observe certain familiar details which are not discernible at this distance from my eye. This verifying experience is not actual; I do not touch the watch. But nothing is lacking for it except my own initiative. At least I believe that to be the case; and this belief is coördinate with the degree of my felt assurance that the watch is real and is mine. This is, perhaps, the simplest case of verifiability—observability at will. All the conditions of the verifying experience are present except only my intent to make the verification.[12]

Next, let us consider the other side of the moon.[13] This is something believed in but never directly observed. The belief is an inference or interpretation based upon direct observation; the moon behaves like a solid object and must, therefore, have another side. But what is believed in must, in order to be real, possess characters which are left undetermined in our belief about it. For instance, there must be mountains there; or there must be none. To speak more precisely, our belief includes alternatives

[12] Such a single experience would not be a theoretically complete verification of my assertion about the watch. As I have elsewhere indicated, no verification of the kind of knowledge commonly stated in propositions is ever absolutely complete and final. However, an *expected experience* of the watch can be completely verified—or falsified.

[13] It will be obvious that there are modes of verifiability which would fall between the preceding illustration and this one. For example, the verifying experience might be such as could be reached, from actual present conditions, by a more or less complicated chain of circumstances, but a chain every link of which is supposedly related to the preceding one in the manner of the first example.

which are not determined; but, if the thing believed in is what it is believed to be, these alternatives must be *determined in the object*. If there were nothing more, and more specific, to the other side of the moon than what is specifically determined in our construction of it, then it would be a logical abstraction instead of a physical reality. These undetermined characters are what we should see if we could build an X-ray telescope, or what we should find about us if we could construct a space-ship to fly up there and land. What we should observe if these things could be accomplished is what we mean by the other side of the moon as a physically real thing—as something more than a logical construction put upon presently given data.

The projected verification in this case is ideal in a sense which goes quite beyond the preceding example. It is humanly possible, perhaps; men may some day build space-ships or X-ray telescopes. But the conditions of this verification—or any other direct empirical verification of the thing in question—include some which we cannot meet at will. We cannot, by any chain of planned activity, completely bridge the gap between actual conditions and the projected verification. Obviously, then, unless belief in the other side of the moon is meaningless, it is not requisite to such empirical meaning that the verifying experience should even be possible at present, in any narrow interpretation of that word 'possible'. To analyse the conception of 'verifiable' which would extend to such cases would be a large order. I shall only suggest what I think might be some of the critical points. (1) As this example serves to illustrate, any reality must, in order to satisfy our empirical concept of it, transcend the concept itself. A construction imposed upon given data cannot be identical with a real object; the thing itself must be more specific, and in comparison with it the construction remains abstract. In making any verification we expect something which we cannot anticipate. This is a paradox in language; but it is, or should be, a commonplace of the distinction between ideas and objects. (2) In making 'verifiability' a criterion of empirical meaningfulness, the primary reference is to a supposed character of what is conceived rather than to any supposed approximation of the conditions of verification to the actual. (3) The requirement of 'verifiability' for *knowledge* is a stricter one,

because knowing requires, in addition to meaningfulness, some ground of the assurance of truth. But, as this example makes clear, even the 'possible verification' which is requisite to empirical knowing cannot be confined to the practicalities, or by detailed comprehension of the procedure of such verification. We do not command the means for making any direct verification of our belief in the other side of the moon; but what this signifies is that, with all the means in the world, we do not *know how* to. If it be said that it is required for empirical meaning—or even for knowledge—that we should lay down a rule of operation for the process of verification, it should be observed that sometimes this rule of operation will have to be rather sketchy. This difficulty—if it is a difficulty—will be found to affect not only such extreme cases as the other side of the moon but quite commonplace items of knowledge as well.

I join with you in feeling that such considerations smack of triviality; but certainly a theory which could be overturned by such trivial facts would not be worth holding. Just what we can sensibly mean by 'empirically verifiable' is really a bit obscure. Perhaps the chief requirement ought to be that we should be able to analyse the supposed connection between the projected verifying experience and what is actually given (the 'rule of operation') in such wise that this procedure of verification can be envisaged *in analogy with* operations which can actually be carried out. The degree to which such analogy could be made complete would, I think, justly affect the significance of our supposed knowledge.

As a third example let us take the case of the electron. The existence of electrons is inferred from the behavior of oil-droplets between charged plates, tracks registered on photographs of the discharge from cathodes, and other such actually observed phenomena. But what is it that is inferred; or is anything really inferred? Some physicists, for example Bridgman, would say that our concept of the electron comprehends nothing more than these observable phenomena, systematically connected by mathematical equations in verifiable ways. The layman, however, and probably most physicists, would not be satisfied to think of "electron" as merely a name for such observable phenomena. But what more may they suppose themselves to be believing in? An electron is

too small to be seen through any microscope which ever can be made, and it would not stay put if a beam of light were directed upon it. It is equally beyond the reach of the other senses. But is the phrase "too small to be directly perceived" meaningful or is it not? And how direct must a "direct verification" be? Suppose it to be urged that no one can set a limit to scientific inventiveness, or anticipate the surprises which investigation of the subatomic will quite surely present; and that if or when such developments take place, definitely localized phenomena may perhaps be observed within the space to which the mass of the electron is assigned.

Whether this is or is not a question about the real nature of the electron, and what limitations should be imposed on useful conceptions in physics, are matters concerning which I could not have a competent opinion. But there is a general point here which all of us can judge. A hypothetical conception of an empirical reality cannot be definitely ruled out unless we can say categorically that the conditions of its verification could never be realized. Between those conceptions for the verification of which we can definitely specify a rule of operation, and those which we can definitely eliminate as theoretically impossible, there is an enormous gap. And any conception which falls in this middle ground is an hypothesis about empirical reality which possesses at least some degree of meaningfulness. If those who believe in the electron as a sort of ultramicroscopic bullet cannot envisage this object of their belief in such wise that they would be able to recognize certain empirical eventualities as the verification of it, in case the conditions of such verification *could* be met, then they deceive themselves and are talking nonsense. But if they can thus envisage what they believe in, then the fact that such verifying experience is highly improbable, and even that the detail of it must be left somewhat indefinite, is no bar to its meaningfulness. Any other decision would be a doctrinaire attempt to erect our ignorance as a limitation of reality.

The requirement of empirical meaning is at bottom nothing more than the obvious one that the terms we use should possess denotation. As this requirement is interpreted by pragmatists and positivists and others who share the tendencies of thought which have been mentioned, no concept has any denotation at all unless

eventually in terms of sensuous data or imagery. It is only in such terms that a thing meant, or what a proposition asserts, could be recognized if presented to us. But, as the preceding considerations are intended to make clear, the envisagement of what would thus exhibit the denotation or verify the assertion—which is all that meaning requires—has little or nothing to do with the question whether the conditions under which the requisite presentations could be realized can be met or not. Whether such verfying experience is mine or is yours or is nobody's; whether it happens now or in the future or never; whether it is practically possible or humanly problematic or clearly beyond our capacity to bring about—all this is beside the point when the only question is that of theoretical meaningfulness.

One may be tempted, in protest against various forms of transcendentalism and verbalism, to announce the unqualified dictum that only what is verifiable can be known, and only what is knowable can be the subject of a meaningful hypothesis. But such flat statement, while true in general, may nevertheless be misleading on account of an ambiguity in the word 'verifiable'. On the one hand this connotes a certain character of the content of one's assertion or hypothesis. This must be envisaged in sensuous terms; it must be the case that we could recognize certain empirical eventualities as verifying it, supposing that the conditions of such verifying experience could be satisfied. Verifiability in this sense requires an empirical *content* of the hypothesis, but has nothing to do with the practical or even the theoretical difficulties of verification. Whatever further restrictions may be appropriate in physics or any other natural science, the only general requirement of empirical meaning—which alone is pertinent to those hypotheses about reality which philosophy must consider—is this limitation to what can be expressed in terms which genuinely possess denotation.

On the other hand, 'verifiable' connotes the possibility of actually satisfying the conditions of verification. Or, to put it otherwise, verifiability may be taken to require 'possible experience' *as conditioned by the actual;* we must be able to find our way, step by step, from where we actually stand to this verifying experience. Hence practical or theoretical difficulties are limitations of verifi-

ability in this second sense. These limitations may be genuinely pertinent to knowledge, because *knowledge* requires the *assurance of truth;* and whatever would prevent actual verification may prevent such assurance. But verifiability in this second sense has no relevance to meaning, because the assurance of truth is, obviously, not a condition of meaningfulness.

It is of importance to avoid confusing these two senses of 'verifiable' in assessing the significance of those considerations which methodological solipsism makes prominent. If it could be said that actual knowing must rest upon verification which, in the end, must be first-person and must be here and now when the knowing occurs, at least it would be an absurdity to translate this into the negation of meaning to whatever cannot be expressed in terms of first-person experience and of experience here and now. I impute this absurdity to no one; I would merely urge the necessity of avoiding it.

It is likewise important, in the same connection, to bear in mind what have been called the two moments of cognition. It is a fact that past experience is a given datum only in the form of memory; the future, only in the form of imagination. And the reports of others are data for the knower only in that form in which they lie within the egocentric predicament. Hence any idea which can occur with cognitive significance must be a construction by the knower, ultimately in terms of first-person present data. These predicaments, however, are limitations of the moment of entertainment. If one should conclude that because the cognizing experience must take place within the boundaries of the first-person and the immediate, therefore the object of that knowledge, so far as it is genuinely known or meant, must also lie within those limits, one would be overlooking the distinction between the experience which entertains and the projected experience which would verify what is thus entertained. The distinction of these two is of the essence of cognition as contrasted with esthetic enjoyment of the immediate. To identify them would be to reduce knowledge and meaning to absurdity. Again, I do not impute to anyone this identification of the idea, in terms of immediate data, with the object, specifiable in terms of possible experience or experience which is anticipated. I would only urge the desirability of avoiding this fallacy.

In the time which remains it is a bit absurd even to suggest any bearings which the above may be supposed to have upon metaphysical problems. But with your indulgence I shall barely mention three such issues.

One traditional problem of metaphysics is immortality. The hypothesis of immortality is unverifiable in an obvious sense. Yet it is an hypothesis about our own future experience. And our understanding of what would verify it has no lack of clarity. It may well be that, apart from a supposed connection with more exigent and mundane problems such as those of ethics, this hypothesis is not a fruitful topic of philosophic consideration. But if it be maintained that only what is scientifically verifiable has meaning, then this conception is a case in point. It could hardly be verified by science; and there is no observation or experiment which science could make, the negative result of which would disprove it. That consideration, however, has nothing to do with its meaningfulness as an hypothesis about reality. To deny that this conception has an empirical content would be as little justified as to deny empirical content to the belief that these hills will still be here when we are gone.

Next let us consider that question about the external world, supposedly at issue between idealists and realists. One suspects that the real animus of debate between these two parties is, and always has been, a concern with the question of an essential relationship between cosmic processes and human values; and that if, historically, idealists have sought to capture their conclusion on this point by arguments derived from a Berkeleyan or similar analysis of knowledge, at least such attempt has been abandoned in current discussion. So that this question about the external world, in any easily statable form, is probably not pertinent to present controversy. But there is one formulation which, if it is too naïve to be thus pertinent, at least poses an intelligible question about the nature of reality. Let us phrase this as a realistic hypothesis: If all minds should disappear from the universe, the stars would still go on in their courses.

This hypothesis is humanly unverifiable. That, however, is merely a predicament, which prevents assurance of truth but does not affect meaning. We can only express or envisage this hypothesis

by means of imagination, and hence in terms of what any mind like ours *would* experience if, contrary to hypothesis, any mind *should* be there. But we do not need to commit the Berkeleyan naïveté of arguing that it is impossible to imagine a tree on a desert island which nobody is thinking of—because we are thinking of it ourselves. It is entirely meaningful, for example, to think of those inventions which nobody has ever thought of, or those numbers which no one will ever count; we can even frame the concept of those concepts which no one will ever frame. Those who would deny this on logical grounds exhibit a sense for paradox of language which is stronger than their sense of fact. Furthermore, *imagination* is sufficient for empirical meaning, though it requires *perception* for verification. I can imagine that future time which I shall never perceive; and humans can meaningfully think of that future when humanity may have run its cosmic course and all consciousness will have disappeared. It may be that the hypothesis of a reality with no sentience to be affected by it is not a particularly significant issue; though the idealist might have an interest in it for the sake of the light which decision about it would throw upon the nature which reality has now. In any case, the fact that it is unverifiable has no bearing upon its meaningfulness. Whether this hypothesis is true, is a genuine question about the nature of reality.

Finally, we may turn to the conception of other selves. The importance which this topic has for ethics will be obvious. Descartes conceived that the lower animals are a kind of automata; and the monstrous supposition that other humans are merely robots would have meaning if there should ever be a consistent solipsist to make it. The logical positivist does not deny that other humans have feelings; he circumvents the issue by a behavioristic interpretation of "having feelings". He points out that your toothache is a verifiable object of my knowledge; it is a construction put upon certain empirical items which are data for me—your tooth and your behavior. My own toothache is equally a construction. Until there are such prior constructions as the physical concept "teeth", from given sense-data, neither your toothache nor mine is a possible object of knowledge. And, similarly, until there is a construction involving such prior constructions as human bodies, there is no

own-self or yourself as particular objects of knowledge. As knowable things, myself and yourself are equally constructions; and though as constructed objects they are fundamentally different in kind, the constructions are coördinate. That experience which is the original datum of *all* such constructions is, in Carnap's phrase, "without a subject".[14] Nevertheless it has that quality or status, characteristic of all given experience, which is indicated by the adjective "first-person".

With the general manner of this account of our knowledge of ourselves and others I think we should agree. But it does not touch the point at issue. Suppose I fear that I may have a toothache tomorrow. I entertain a conception involving various constructions from present data; my body, teeth, etc. But my present experience, by which I know or anticipate this future toothache, is not an experience of an *ache*. There is here that difference which has been noted between the experience which entertains and the experience which would verify, to which it implicitly refers. A robot could have a toothache, in the sense of having a swollen jaw and exhibiting all the appropriate behavior; but there would be no pain connected with it. The question of metaphysical solipsism is the question whether there is any pain connected with your observed behavior indicating toothache. The logical positivist claims that this issue has no meaning, because there is no empirical content which could verify the non-solipsistic assertion—that is, no content unless, following his procedure, I identify your pain with observable items such as the behavior which exhibits it; in which case it is verifiable in the first person. To make this identification, however, is to beg precisely the point at issue.

Let us compare the two cases of your toothache now and my toothache tomorrow. I cannot verify your toothache, as distinct from your observable behavior, because of the egocentric predicament. But neither can I verify my own future toothache—because of the now-predicament. My tomorrow's pain, however, may genuinely be an object of knowledge for me now, because a pain may be cognized by an experience in which that pain is not a given ingredient. (The imagination of a pain may be painful; but it is not the pain anticipated. If it were, all future events which

[14] See *Logischer Aufbau der Welt* § 65.

we anticipate would be happening already.) *Your* pain I can *never* verify. But when I assert that you are not an automaton, I can envisage what I mean—and what makes the difference between the truth and falsity of my assertion—because I can imagine your pain, as distinct from all I can literally experience of you, just as I can imagine my own future pain, as distinct from the experience in which I now imagine it.

In the nature of the case I cannot verify you as another center of experience distinct from myself. Any verification which I might suppose myself to make would violate the hypothesis by being first-person experience. But there is nothing to which I can give more explicit empirical content than the supposition of a consciousness like mine connected with a body like my own. Whether there is any such would be a terribly important question about reality if anybody entertained a doubt about the answer. Whether you are another mind or only a sleep-walking body is a question of fact. And it cannot be exorcized by definitions—by defining 'meaningful' so as to limit it to the verifiable, and 'verifiable' by reference to the egocentric predicament.

This conception of other selves as metaphysical ultimates exemplifies the philosophic importance which may attach to a supposition which is nevertheless unverifiable on account of the limitations of knowing. Though empirical meaning is requisite to theoretical significance—and that consideration is of first importance in guarding against verbal nonsense in philosophy—still the sense in which a supposition is meaningful often outruns that in which the assurance of truth, by verification, can genuinely be hoped for. In limiting cases like this last question it may even outrun the possibility of verification altogether.

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FUNCTIONAL REALISM*

THE American realists[1] have grouped all types of realism into two classes: "naïve" and "critical". Both titles are misnomers, since the "naïve realism" of philosophers is sophisticated and "critical realism" is based on dogmatic assumptions. But they serve to indicate two different attitudes to our knowledge of nature. Because of the wide publicity which these two attitudes have had in America, a third fundamental type which I shall call "functional realism"[2] has been neglected though its lineage goes back to Protagoras. It is this type which I shall try to explain and defend in this paper.

It is not my purpose in this paper to exhibit the variety of realisms, which are only limited by ingenuity in coining phrases for various permutations. I am concerned with the underlying principles. From this point of view there seem to be three fundamental types and the remainder can be considered as hybrids or variations. (1) The type which holds that the qualities and the relations which we sense exist in objective nature independently of the percipient organism, just as we perceive them. This is naïve or direct realism in the strict sense. (2) The type which holds that the qualities and relations which we sense are mostly due to the percipient organism and do not exist in objective nature as we perceive them. This would be critical realism in the strict sense. (3) The type which holds that the qualities and relations which we perceive are functions of objective nature and the percipient organism in perspective relation to one another. This type I call functional realism.

Naïve and critical realism have one fundamental assumption in common. They both assume that to say that substances and qualities exist independently of the environment has a meaning.

* The presidential address to the Pacific Division of the American Philosophical Association at the University of California at Los Angeles, December 29, 1933.

[1] British realists, such as G. E. Moore, C. D. Broad, H. H. Price and others, have made a more extensive analysis of types. But I am concerned with underlying principles rather than with variety of types.

[2] For the author's previous statements see *Truth and Reality* (1911) Chs. xiv and xv; an article "Knowing Things" in THE PHILOSOPHICAL REVIEW, 1912; expanded in Chapters 5 and 6 in *A Realistic Universe*, 1916 (revised 1931); and Chapter 7 ("Space-Time Perspectives") of *Cosmic Evolution*, 1925.

They make, at the outset, a bifurcation of thing and environment as though they were only externally related. They postulate things in themselves with properties in themselves. This postulate rests on an antiquated science. According to the old scientific conception—which goes back to Leucippus and Democritus—an atom would remain the same though everything else were destroyed. Its character is intrinsic to itself. This postulate leads to opposite results in naïve and in critical realism. The naïve realist implies that the percipient is neutral in his awareness of the external world and therefore he perceives the qualities and relations in external nature as they are in themselves. He fancies himself to be an angel. The critical realist is aware of being in the flesh and believes that the percipient organism, by a characteristic action of its own, fakes the properties of the external environment and therefore he cannot get to the properties of the external substance as they are in themselves. But both the naïve and the critical realist assume that there are things in themselves with properties in themselves. About the relation of these properties to the thing in itself neither troubles himself. And the reason for this is that both of them are part of the Aristotelian tradition, *viz.*, that properties inhere in substances. Aristotle supposed that it is possible analytically to abstract these properties from the substance until you get to the underlying indeterminate substrate—like peeling off the layers of an onion, and, as in the latter case, nothing remains.

As opposed to the assumption of things in themselves with properties in themselves, functional realism holds in common with present science that the bifurcation of thing and environment is vicious, that things exist only in fields, in mutuality with other things, and that they have properties only in their dynamic interrelations. We may illustrate this conception with the property of weight, one of the most fundamental properties of the physical world. Democritus and Plato thought that weight is due to the amount of matter. Since the atom is supposed to be a plenum, *i.e.*, absolutely full of matter, the difference in the weight of atoms must be due to difference in size. Weight was supposed to be an absolute property and in no way affected by the environment of the atom. Newton discovered that it is functional, that it depends upon the relation of matter to its environment. Without an environ-

ment of matter there would be no meaning to saying that an atom has weight. Unfortunately, Newton did not see the bearing of this discovery upon substance and property generally. If he had, the course of modern science and of modern philosophy would have been different. Philosophy would not have been haunted by the ghost of things in themselves and modern naïve realism and critical realism would have died unborn.

Since properties are dynamic relations of energies involving time and space and are therefore directional (or, as mathematicians would say, have the vector-character) within the dynamic network of nature, we may speak of them as perspective relations. A configuration of energy, which we select as a frame of reference, exists as such a configuration and has the character it has by virtue of taking account, in its own way (because of its history and organization), of the environmental configurations of energy in specific space and time relations within the cosmic situation. This does not mean that the individual configuration does not count. The relation of mutualness of parts would have no significance unless the parts contributed to the relation. Nature consists of a great variety of individual systems of energy with their individual history, organization, inertia and "aptness" (as Locke would say) to participate in the cosmic matrix. Science indicates that there is an element of indeterminacy in the behavior of nature, and therefore an element of uncertainty in the prediction of individual reactions, though if we take individuals in the mass we may have statistical prediction. But what I wish to emphasize is that no individual organization, be it an atom or a human personality, lives to itself or dies to itself, but all are members, one of another, and of the whole cosmic community, with its super-individual control.

If we speak of the dynamic relations in nature as perspectives, we must understand that the perspectives are integral to reality and not merely incidental, as those who cling to substances in themselves with properties in themselves are apt to suppose. "In the perspectives of experience", says Santayana, "I cannot, except in these very perspectives, reach the terms which they posit as self-existent in order to see whether my perspectives were rightly drawn. I am in the region of belief mediated by symbols, in the

region of animal faith."[3] If one held, as Santayana does, to "self-existent terms", one certainly would be in a dilemma and it is doubtful whether even "animal faith" would help. But self-existent terms are a fiction of an antiquated science. "A thing is what it does", as St. Thomas Aquinas and Lotze truly affirmed. And a thing does not do anything by itself. It exists and has properties only when it reacts with something. It is itself only as it is mutual, as Hegel might say. Its properties are due to what it acts on as well as to itself. The physicist has learned that he cannot say what an electron is when it does not act. Its character of individual particle is very likely due to the encounter with radiation or another electron. All we know about it is what it is when it acts. Anything else is a *post facto* projection. And that is true of everything else. To act implies space and time. It implies direction of action from a certain place and time to a certain place and time. We cannot say *a priori* that the direction must be straight. That depends upon the field in which the action takes place. The direction may be curved. But we can say that all action is perspective from some configuration to some configuration of energy in time and space. What we consider as the terminus of the action is as much a part of it as what we call the initiation, and the two are reciprocal. There is not in nature the relation of active and passive. Everything in nature is active. What we consider as agent or as re-agent depends upon our interest. Nature knows no such distinction. Perspectives in nature are nature in action and nature exists only in action. But one perspective cannot give the whole of reality. Nature exists in an indefinite number of perspectives in the plurality of interacting systems of energy in nature. There is also an indefinite number of possible perspectives. Possible perspectives of action are perspectives which may occur when certain conditions shall be present which are not now present. I see the salt granules. That is an actual perspective. But I can also put salt on the tongue and get its saline taste. That is a possible perspective relation. Since I have experienced this saline reaction at various times, I consider it as one of the possible properties of salt.

We may call the reactions of nature, of which we must take

[3] *Scepticism and Animal Faith* 115.

account as immediate data, *primary perspectives* as contrasted with our judgments of nature which we may call *secondary perspectives*. These two types of perspectives vary independently of one another, the former with the conditions in nature and independently of my interest, the latter with my psychological history. We do not create the primary perspectives by taking account of them. The salt produces a saline reaction on my tongue, whether I want salt or not. I may mistake it for sugar, but it still tastes saline. Whether I want it or what my judgments are about it depends upon the psychological situation which in turn is bound up with my past experience. The primary perspectives are objective to my secondary perspectives. The secondary perspectives are subjective, but that does not mean that they are unreal. They are part of nature as truly as the primary perspectives. They may be more important to my conduct than the primary perspectives. It may be vastly more important to me what a person's subjective point of view is than what he perceives as objective in nature. And it may be more difficult to change it than to change the configuration of the landscape. Subjective points of view are energy-perspectives of which we must take account.

While we may distinguish for purposes of analysis between primary and secondary perspectives, they are not separated in our life in nature. In the adult perception of philosophers, conceptual elements, including language, enter into their perceptions of nature. The conceptual elements permeate the perspectives of immediate experiencing, and become identified with the situation as sensed. This accounts for our perception of definite things. We do not sense *things*, though from philosophers' talk about pens and tables one would suppose that we do. Things are the result of interest and conceptual interpretation. A pen or a table is a group of perspectives in nature that fulfils a definite purpose. A table is not "given", liberal though philosophers are with the "given". If "given" has any legitimate meaning, it is that we can abstract an aspect of nature and use it as a datum or problem for investigation. Material things are not given any more than spiritual things. Both are interpretations of the aspects of nature. Both involve a high grade of social consciousness with the fixations of meanings in language. History shows that we are only too apt to introduce

our evaluations into the primary perspectives of nature. Such an evaluation is that of primary and secondary qualities. This distinction is irrelevant to nature as sensed. It is the result of an evaluation of nature for our purposes—descriptive, practical, esthetic. So is the distinction of appearance and reality. The experience of nature on the level of philosophers is shot through with judgments and evaluations which philosophers too often confound with the "given". On the reflective level there can be no "raw experience". To have such experience of nature we should have to return to early infancy. For reflective human nature perceiving is conceiving. But we must see to it that the conceptual interpretation is relevant and adequate to nature as experienced. The conceptualizing of our immediate experience, no doubt, enriches our understanding and enjoyment; and it makes possible the control of nature. But we should not confuse the conceptual elements with our immediate perception.

We must distinguish between the qualitative perspectives of nature and the spatial and temporal perspectives in the causal matrix of nature. The failure to make such a distinction has resulted in much confusion in our epistemological theories. Qualitative perspectives are nature actualized in the specific situations in which we sense and feel nature. They are nature as immediately lived. They include the causal conditions of nature. For purposes of prediction and control we analyse the causal situation into factors and conceive our qualitative world as emerging from these. But the causal factors must not be taken in the abstract. They are projections by the mind to account for the qualitative world and must be relevant thereto. They are real only as actualized in that world. Nature is what it reveals itself as being in our qualitative experience, though it is not exhausted therein. In nature are an indefinite variety of qualitative occasions of which human nature is not a part.

Our qualitative experience carries its own credentials. Primitive man lived this qualitative world as truly as we, though he was ignorant of the causal conditions, and we know but little of them. Like primitive man we eat what agrees with us and depend upon nature to do the digesting. The world of qualitative experience is rich. It includes not only the sense-aspects which we refer to ex-

ternal things, but also our feelings, our values, which reveal nature under certain conditions as truly as do the sense-qualities which we use as descriptive of nature. For the organism, with its interactions, is part of nature as much as the external world. Nature is pleasant or unpleasant as truly as it is extended and colored.

The qualitative experience of nature has its own completeness. Its qualitative aspects cannot be eked out by reference to the causal conditions of nature, but only by reference to one another. The qualitative acquaintance with nature through one sense is eked out by qualitative experiences through other senses, and external sense-experience is eked out with affective and motor experience. Man could not have lived if a causal knowledge of the world had been a requisite for his qualitative experience. He has adjusted himself to his world, first of all, on the basis of his qualitative experience of his reactions to nature. He has been guided in his use of the environment by the qualities of things as he has sensed them and the felt satisfactions and dissatisfactions which things have produced in his experience of them. The values of things have been of no less importance than the descriptive qualities. In fact, the former have been practically of prior importance, though not more real than the latter. In this qualitative world the organism has oriented itself to things spatially and temporally, as the magnet orients itself to the lodestone and as the plant orients itself to light. Like the magnet and the plant, the human organism exists in the spatial and temporal field of nature. It does not, any more than the magnet or the plant, require "animal faith", as Santayana supposes. Nature is activity and activity is spatial and temporal. There is no mysticism in this except in a false philosophy. Because different observers can have the same organic perspectives in nature, the qualitative aspects which they investigate become integrable and, therefore, communicable as between different observers. Different organic perspectives, whether for one observer or as between observers, are not integrable if the qualitative difference can be distinguished, though they may practically be integrable, *i.e.*, the difference may not matter for the purpose.

Qualitative experience has its own temporal and spatial perspectives. Man's kinesthetic sensations have enabled him to adjust himself by organic habits to the distances of things and the motions

of things, even before he learned to reduce his qualitative world to quantitative measures, though these have added greatly to his effectiveness. The quantitative measures are themselves part of the qualitative world. We measure sensible magnitudes by other sensible magnitudes which we select as our units. We do not measure magnitudes in our brain, however abstract we may become in our calculation and however convenient it may be to substitute numbers for the sensible magnitudes. The scientist may fool himself into thinking that he is just dealing with abstract counters or "pointer readings", but these would have no meaning except for the concrete world from which they are derived. Even the magnitudes which are far below our sense-perception must be measured indirectly in some way with reference to scales which we can perceive, or we should have no evidence.

Through its kinesthetic sensations from joints, muscles and tendons the organism has the qualitative experiences of motion, resistance and strain in its life in nature. It is from these humble organic sensations (together with the diffuse sensations from our autonomous system) that we get our first-hand realization of the "go" of nature. And however abstract our mathematical and physical description of the "go" of nature may become, it has its starting point in these specific organic sensations, without which, as Poincaré truly saw, we should have no mathematics or physics. Without the sensations of movement we should have no geometry and without these and the sensations of strain and resistance we should have no physics, though it does not follow that we can transfer our macroscopic experience of pushing and pulling to the minute conditions of nature, whether within or outside the organism, as the old physics did. Even our most ideal activity, with its consciousness of intention or direction, is dependent upon these humble organic sensations for its consciousness of realization. For man is an organism and not a ghost; and his activity, whether of the primary or secondary level, is the activity of an organism.

It is evident that the human organism requires a variety of experiences—visual, auditory, kinesthetic, affective, etc., for its acquaintance with nature, but these are integrated into the life of the organism, as a whole, to further its will to live. It is a vicious abstraction to conceive of man as just a sensory being in his life

in nature. The externally referent sensory life of man is bound up with his affective and his motor life. If his sensory life determines his affective and his motor life, these no less determine the effectiveness of his sensory life. There can be no impression without expression. What we perceive is conditioned not only by what we sense, but by what we feel and by the motor adjustment of the organism, as Brown[4] has so well shown. We cannot understand the life of the organism in nature unless we view it as an integral whole—sensory, affective and motor—in the hierarchy of organization which is involved. Of this hierarchy we are not immediately aware. It belongs to the causal conditions of nature which we postulate in order to understand the life of nature. But this organization figures none the less in the actuality of man's life in nature.

The confusion of the immediately experienced qualitative perspectives of nature with its inferred, problematic, causal factors has dogged both the direct and the critical realists. When the direct realist says that the light-rays are colored independently of our organic reaction, he has attributed to one part of the causal nexus what is the function of the whole, including the organism. It is as though he should say that because H_2O is wet hydrogen must be wet. Sir James Jeans has shown that when we look at the blue sky or the sunset through a long narrow tube, we perceive no color but only splotches of grey. The environing parts of the retina must be stimulated to get the color effect. But further than that, the sensory surface itself would not exist except for the sensing. We could not by getting nearer the perceived object get the object which the physicist infers from his more refined instruments, physical and conceptual. It is of no interest to us that the direct realists have sometimes lost their nerve and have attributed some of the sense-qualities, such as those of taste and smell, to the action of the organism, since we hold that all the sense-qualities are compound functions, involving stimulus and organic conditions. Olfactory qualities are no more or less organic than color qualities. Nor is it of any interest to us that some realists, like Thomas Reid and S. Alexander, have postulated a special faculty of intuition

[4] See Harold Chapman Brown's presidential address for 1932, "Mind: An Event in Physical Nature", THE PHILOSOPHICAL REVIEW, XLII 130-155. The phrase, "physical nature", shows the author's prejudice.

for the so-called primary qualities. All perceived qualities are alike sensory experiences of nature.

The critical realists have been no less confused as regards the qualitative field of perception and the causal conditions. They too have held that we must get to the physical agitations at the source or in the immediate vicinity of the stimulating energies in nature in order to get the real character of the sensed object. But they have been troubled by the fact that their organisms are not neutral but react in characteristic ways. If naïve realists imagine that they are angels, the critical realists try to imagine what the world would be if they were angels. We cannot examine the variety of ways in which the critical realists have conceived the relation of the percipient organism to external nature. Some, following Locke, have thought that the primary qualities get through somehow and that we perceive them as they really are in nature or at any rate very like what they are. But how can we know? If we compare the macroscopic world of our perception with the postulated microscopic world of the mathematical physicist, it is difficult to see what the resemblance can mean. Other critical realists have maintained that we perceive no qualities as they are in nature, but only the mathematical relations, forgetting that mathematical activity is certainly as characteristic of the percipient organism as the sensory activity. If they mean that we perceive geometrical configurations in the field of immediate qualitative experience, that is true. But these are certainly as organically conditioned as the qualitative aspects of the field. Morever, psychology has shown that the geometrical configurations are marked off by the qualitative aspects. Light and grey shades are particularly effective in marking off contours. The color aspects are not so effective, as they tend to blend. But what these critical realists mean is presumably that the geometrical contours to which they give a peculiarly objective status are identical with or at least resemble the contours of the external physical field in the absence of the percipient organism—if he only could get to them. Alas! if only the critical realist had no eyes he might see. As it is, the contours he perceives are certainly due to the selective reaction of the organism. Without the organic reaction there would be no continuous surfaces in nature. In short, the critical realist has made the same mistake as the

direct realist in attributing to one set of causal conditions in nature, *viz.* the physical, what is a compound function or emergent of the physical and the organic conditions in conjunction.

Other critical realists go the whole length and maintain that both the qualitative characters and the mathematical relations are contributed by the percipient organism. This was the position of Kant and seems to be the position of Whitehead. This means universal agnosticism as regards the knowledge of nature and is the logical result of critical realism. This Kant clearly saw and was properly puzzled over the fact that science discovers empirical laws in nature. As I understand Whitehead, the organism first projects a geometrical schema and then invests it with the sensory qualities which it fabricates. He admits external stimulus but regards this as "irrelevant". But if the rhythm and intensity of the external stimulus show a correlation with the sensed quality it is difficult to see how they can be irrelevant. It is true that the organic condition is also a factor, and this may produce variation in quality independently of the external stimulus. For example, towards twilight, when the intensity of light is weak, the organism does not respond to wave-length with a characteristic color discrimination and the environment is murked in grey. But with dual conditions we should expect variation in quality with the variation of either condition. Presumably what Whitehead has in mind is that when an external energy, such as light, acts upon another kind of instrument, such as an interferometer, it reveals itself as frequencies and not as color. But we should expect light to reveal different characters in acting upon different instruments. When light acts upon a normal retina under normal daylight conditions, it is colored. Color is light when actualized in the retina. As Aristotle put it, when light does not act upon the eye it is only potentially color but when it is actualized in the eye it is color and then the world is colored. Of course this is only one way in which light may be actualized. It may also be actualized in the interferometer and then it is frequencies. Is not frequency an emergent property as much as color? What can frequency mean apart from proper instruments of reaction?

Whitehead, however, attributes little importance to sense-quality. Instead, he stresses feeling. His language of feeling is as

fluctuating as the feelings. He sometimes uses feeling in the psychological sense of feeling tone. In this sense, it is a fusion of a large mass of organic sensations, especially from the autonomous system. This is an emergent fact as much as the sense-qualities which we use to characterize external things. While feelings are an important revelation of our life in nature, they are certainly not less organic than the more specific sense-qualities. Together with the specific sense-qualities, the feelings constitute the immediate awareness of our life in nature. They are more massive and in that sense richer than the specific sense-qualities. But that is no reason for putting them on a different metaphysical basis. Sometimes Whitehead uses feeling for our whole immediate awareness of nature. This immediate awareness he calls prehension, as contrasted with apprehension. Prehension suggests active seizure; and feeling, instead of being an emergent, becomes an efficient cause in nature. As all nature is organic for Whitehead, feeling becomes *the* efficient causation in nature. And since reality is conceived as dynamic, feeling becomes reality, and Whitehead is brought by his own route to the mysticism of Bradley. Feeling, as one type of the emergent actualization of nature—the florescence of life's activity —becomes the whole of reality. Such ambiguity will give the philosophers much material out of which they can make a living and will no doubt be perpetuated.

Presumably the critical realists consider themselves critical because they base their arguments upon physiology. They demonstrate, if nothing else, Pope's aphorism, "A little learning is a dangerous thing." We know little of the physiological conditions of sense-experience. We do not know what are the respective contributions of sense-organs, intermediate neural centres, and the cerebrum. They all have a share, no doubt, in the conditioning of our qualitative experience. The past emphasis has been upon the sense-organs. But the stimulation of separate nerve-fibres could not furnish the condition of the variation in intensity, since separate fibres act by the all-or-none method. The variation must be due, somehow, to the stimulation of a number of fibres and must be a resultant in the neural centres. The cortex, it seems, may become charged with vibrations which originated through connection with the environment. Not only can a blow on the head make us see

light (though confusedly) but visual and other experience can be initiated from within, as shown by memory-images, not to speak of hallucinations. Direct stimulation of the upper temporal convolution can produce the consciousness of sound and even different pitches of sound (though there may be a reflex effect to the ear and back by way of the centrifugal sensory arc[5]). What seems clear is that the sense-organs and the nervous system under normal conditions act as a unit, and that the sensory quality as perceived is an emergent from the total action of external energy, sense-organ and neural hierarchy. The percipient organism does not sense a stone as a grey patch on its own retina (as Whitehead supposes), though it may sense a patch on somebody else's retina. Seeing is first of all a photochemical process and it involves the hierarchy of neural centres as well as the retina. For spatial localization in two or three dimensions there must be a schema of the cortex, as Head has shown. When the cortex is badly disintegrated, whether from disease or accident, the patient loses his epicritic sensibility, *i.e.* he can no longer distinguish locality, intensity and rhythm. But neither can we regard a percept as a patch in the cortex, as Bertrand Russell seems to think. It could not be revealed by microscopes. Russell appears to have confused the causal conditions of sensing with the emergent fact of sensing. We may have external perceptions of the brain, even of the living brain through an operation of trepanning. We might even see our own brain in such an operation with properly placed mirrors and we might conceivably touch it with our fingers, but that is a very different sort of functioning from the brain's *perceiving* its own sense-aspects.

All primary perspectives in nature are real. There can be no question of their existence, whether it be the perspectives in the physical and chemical transactions outside of the organism or the sensory perspectives in the interaction of the organism with its physical environment. There are no illusions in the primary perspectives of nature. All illusions are due to judgments, whether it be the implied judgments on the level of "conditioned responses" with which the behaviorist deals, or the articulate judgments in

[5] See the author's *Cosmic Evolution* (1925) 151.

which the philosopher is interested, or the gradations between these levels. The challenge of the reality of our immediate sense-perspectives on the ground of illusions is based upon a confusion of secondary factors in experience with primary factors. That a stick appears bent when seen in the water is not an illusion on the primary level. The appearance of bentness is a true perspective, physically and organically, in that situation in nature. It becomes an illusion only when we judge that because a stick appears straight in the air, it should have the characteristic of straightness when seen in the medium of water, or when we demand that because the visual appearance of straightness in the air correlates with the tactual appearance of straightness, therefore the tactual and visual appearances should be correlated when the stick is seen in the medium of water. But there is no *a priori* reason why appearances in different sense-perspectives should have a constant correlation. Things with a pleasant taste are generally correlated with pleasant organic effects in the alimentary system, but when they give us a stomach-ache we do not call that an illusion. Images in mirrors have been called illusions. But there is no illusion in the primary perspective. The reflection of light in a mirror is a true physical perspective and the sensing of the physical transaction is a true organic perspective. It is only when some one judges that the image in the mirror is the thing itself, as perhaps a young dog or a young child or a critical realist might do on the basis of resemblance, that there is an illusion. But there is no illusion either in the physical perspective of refraction and reflection or in the organic sensing of the physical situation. It is only because we are prone to identify the secondary perspectives, which are the result of the psychological set and history of the observer, with the primary perspectives of sense, that we attribute such illusions to the latter. I do not experience the image in a mirror as an illusion. Functional realism accepts the veridicalness of direct experience. Of the causal conditions of direct experience our knowledge is fragmentary indeed. But our ignorance of the conditions does not invalidate our direct experience.

Since Berkeley's brilliant analysis it should not be necessary to refute the mistaken notion that some sense-qualities have a privileged character, *viz.* that some appearances of shapes or sizes or

motions are true while others are false. As he pointed out, we can have no standard for sense-qualities except other sense-qualities. Some philosophers are still simple enough to imagine that some sense-appearances are true to the physical character of the world, independently of our organic reaction, but microphysics would not give them any aid. It is convenient for certain purposes to select a certain perspective as our standard, but that has nothing to do with the question of reality. Few, I imagine, even among philosophers, would be naïve enough to say that the color seen in daylight is true and that seen in electric light an illusion. It is plain enough that we must select the conditions in nature for which we want a certain color, as any woman would do.

It has been charged against our immediate qualitative experience that it is fleeting—that it is always becoming and never really is and therefore cannot be the basis of truth. This prejudice is as old as Plato. When Hume introspected he could find nothing but feelings and ideas succeeding one another with incredible rapidity, and modern philosophy has generally been introspective. William James adopted from some obscure writer the fiction of "the specious present". The moment of conscious experience was supposed to be a sort of saddleback, including a top or zone of clearness (as Titchener called it) and descending to the vanishing point at either end, one end being the vanishing into the immediate past and the other the emerging of the immediate future. The whole moment was supposed to occupy only a fraction of a second, though it might possibly be stretched to two or three seconds. This fiction has found great favor with philosophers. With psychologists the method of introspection has become suspect or is used cautiously. Behavioristic psychology deals with responses and gestalt psychology with direct experience. In neither case does "the specious present" have any relevance. The specious present was based presumably upon attention. Attending introspectively is a difficult and notoriously uncertain undertaking. We must have objective tests. Now it is found when we try to attend to a black dot on a white background, or when we attend to minimal stimuli —a very faint light, sound, pressure—that attention acts in a rhythmic way. The object goes out and reappears again. The reason for this is obscure. We know that single nerve-fibres quickly

become fatigued and as quickly recover again. The rhythm may be due to the narrow physiological base of the sense-perception. At any rate when the field of direct experience has complexity we can attend to an object for a considerable time. It does not seem to go out. And normally we do not glare at a dot but at a field. We may test the limits of attention temporally by the number of successive sounds of which we can take account without using recall by memory. The number varies with groupings; we can take account of as many limited groups as individual sounds. But attention shows the same limitation in simultaneous exposures. We only perceive, in the sense of being able to recall, a small number of events—dots or numbers or words in an exposed field—but we can recall about an equal number of groups within a limited space. There is no reason to suppose that the limit or the rhythm of attention is the same as the limits or rhythms of sensory experience. We are vaguely conscious of a field of varying complexity and varying relations though we are attending to only a small part, and the gestalt psychologists have shown that the total field is effective in determining the character of that part to which we are attending. The fiction of the specious present seems to serve no useful purpose in psychology and I do not see why it should be kept alive in metaphysics. Attention is the spearhead of action and has great executive importance, but no great metaphysical significance.

Our experience of nature is not a single-file succession of events, but a field with its own extensity and duration, within which we can distinguish parts with varying extensity and duration. The temporal, spatial and causal relations of this enjoyed qualitative field are not added to the qualitative aspects of the field by the mind. They are intrinsic to the field; the qualitative experience is spatial, temporal, causal. The chimpanzee which bit angrily at the branch on the stick, with which it was trying to reach the bananas on the other side of the bars, had the immediate experience of spatial, temporal and causal relations in its qualitative reactions in nature, though it also had the insight to attend to those relations and not merely fumble by mechanical trial and error. It had the consciousness, in its discriminative responsiveness, of its organism as an active factor in nature. If the relations were linguistic abstractions, such as Bradley postulates, we should

indeed be unable to bring the *disjecta membra* of our experience together and should in despair have to fall back on mysticism. But relations are intrinsic to our perspective qualitative experience of nature. This experience is temporal, spatial, causal, with its cumulative organic significance. As a secondary operation upon this matrix of immediate experience, the organism can distinguish similarities and differences in the qualitative field and establish new groupings of sorts or kinds. In recognizing sameness in its reaction it can create "essences" or universals which are derivative from qualitative experience and do not hover in a world of their own.

I see no reason, moreover, to suppose that we perceive past, present and future moments of time.[6] Our direct experience, no doubt, has duration, extensity, groupings, both simultaneous and successive, and relations of nearer and farther, spatially and temporally. But such characters are aspects of direct experience. We may, as a result of our practical interests, have the feeling of goneness of that which has disappeared and of expectancy, which may be merely organic alertness. But the schema of past, present, and future is an ideal construction on the part of high-grade minds. And the quantifying of the direct experience of duration into moments—seconds, minutes, hours, days, years—is certainly as artificial as the quantifying of the direct experience of extensity into units—feet, yards, miles or whatever may be the nomenclature. The schema of past, present, and future and the schema of moments are the results of operations upon our direct experience in the service of conceptual interests. To speak of the handing over of the past or the thrust into the future is plainly an inversion. Our memory makes the consciousness of the past and our expectancy makes the consciousness of the future. These are dimensions which the mind creates, they are not forms which are given to it. More fundamental than our ideal constructions of pastness and futurity are the transformations in nature which, on the one hand, condense into the cumulative organic structures which enable us to re-live in a new situation occasions which we are

[6] For the discussion of past, present and future see the author's *Time and Reality* (1904) Ch. v and *A Realistic Universe* (1916, 1931) Chs. xiv and xv. *Cp.* A. N. Whitehead's *Adventures of Ideas* (1933) Ch. xii.

conscious of having previously experienced, and, on the other hand, emerge as novelty on the background of the present field of experience.

What I wish to emphasize is that we derive our conception of constancy as well as our conception of change from our direct qualitative experience. Within the field of experience there is varying change and varying constancy. Various parts of the experienced field, whether we view it objectively or subjectively, have different durations. Some are fleeting, others endure indefinitely. Sense-qualities in the objective field have a high degree of constancy. Our feelings are supposed to be particularly fleeting, but some endure and become likes and dislikes. Our emotions, while not a matter of a fraction of a second, cannot stay at high pitch indefinitely, but as moods they may have a long duration, as sentiments they may continue indefinitely. It is the constancy of our qualitative experience of nature which leads us to seek for constancy of conditions to explain it. We invent "eternal objects" of matter because of the constancy of the qualitative sense-aspects which we group as material. The qualitative experience is constant within our epoch of nature, but the "eternal objects" have proved very mortal the last few years. Let us give direct experience its due. It is from direct experience that we must derive our concepts, and our concepts are valid only so far as they are relevant to our direct experience. If our qualitative experience which we call water were always perishing and never the same, we should not think of discovering constant elements to explain it. As a matter of history the early conceptions of elements were those of qualities —the wet and the dry, the hot and the cold, and the light and the heavy.

The veridicalness of our sensory information of nature has been challenged on the score that the sensed quality or group of qualities is in a different time and place from the thing perceived. It has been pointed out that if the thing is away from the organism it takes time for the excitement in the things to travel in order to reach the percipient. We cannot say, therefore, that we perceive Sirius, for light is supposed to require eight years to reach our earth from Sirius, and Sirius may have exploded in the meantime. Even when we sense parts of our own organism, it takes time for

the neural excitement to reach the cerebrum; and it even takes time for excitement in one part of the cerebrum to reach another part. According to Whitehead the organism is in the past in perception—past to the soul, which he does not define. The conception of transmission seems to make impossible the consciousness of direct acquaintance with nature which we all feel that we have. We are here face to face with one of the fundamental dilemmas in our conception of nature. Our immediate experience is convincing. We feel in immediate community with nature, including the distant nebulae revealed by means of the telescope and spectroscope. But how can this be, if the excitement, which is part of the causal condition of our experience, takes time to travel? Instead of living in the expansiveness of nature, as we normally feel and believe that we do, we seem on the basis of current philosophy to live only in the cortex and even a patch of the cortex. Must we abandon the evidence of direct experience and instinctive belief? This is doubtless the greatest wave of objection that we are obliged to breast. What Hercules can we summon to get us out of this predicament?

There is another principle which has been overlooked by philosophers, namely, the principle of cosmic immanence. This principle first struck the scientist's attention in his investigation of the minute structure of nature. The Rutherford model of the atom conceived an atom as a planetary system with a central nucleus and with electrons moving around it in various orbits. Bohr found that when there is radiation from an atom, an electron must shift from one spatial orbit to another—from an inner to an outer orbit. The scandal was that this shift is instantaneous. But if electrons are particles of electricity, the shift must take time. Science was confronted with a critical instance of absolute simultaneity in nature, and if such simultaneity can exist on a small scale, it can exist on a large scale. A new conception of the electron was called for and this resulted in the wave-mechanics of Schrödinger. As a wave an electron may be immanent in various orbits, and two or more electrons may be immanent in the same orbit, though not functioning in the same way. It would be too long and too difficult a task to unravel the new quantum physics. But we are here concerned only with the principle of cosmic im-

manence. Schrödinger's electron pervades all space in its three dimensions, though with decreasing intensity. The universe is an interlacing of waves. Everything is immanent in everything else. But energy becomes kinetic only when there are "beats" and a new harmonic must be established. It cannot be said that the wave-conception has crowded out the particle-conception. In direct action electrons seem to bombard as though they were particles. Many physicists regard the wave-conception as the more fundamental, but the evidence seems to require both. The same duality of wave and particle reveals itself in electronic matter as had previously been shown to exist in radiant energy, and the conviction is growing that electronic matter is ultimately a condensation of radiation. It has been held for some time that matter spends itself in the stars as radiation, and there seems to be recent evidence from the physical laboratories that radiation may become condensed into electronic matter.

I believe that the principle of cosmic immanence is the Hercules which can rescue direct experience from the onslaughts of epistemologists. Let us transfer the scene to physiology. Increasing evidence shows that the brain does not act merely as a collection of neurons but also as a field, *i.e.*, as a unit. The structure of the whole brain is involved (as shown in experiments in re-education and elsewhere) in perception, in the learning process, in remembering and thinking. That means that in some respects the parts of the brain are immanent in the whole and the whole brain is immanent in the parts. Biochemists, led by Claude Bernard, have come to the conclusion that in some respects the organism acts as a whole. This has been brought out strikingly in the researches of J. S. Haldane on breathing, and L. J. Henderson on the circulation of the blood. That the cerebrum is immanent in the lower neural centres and in the sense-organs is shown by the epicritic control and dominance which it exercises upon the processes of sensing and reaction. Without this control the human organism, at any rate, reverts to sensing and action of the all-or-none type. We may of course turn the situation round and say that the sense-organs, lower neural centres, glands, are immanent in the cerebrum.

Let us now extend the conception of immanence to cosmic pro-

portions, and we may say that in some real respects the human organism is immanent in the cosmos and the whole cosmos is immanent in the human organism. We shall later touch upon the conception of cosmic adjustment. We may say that there is a real sense in which Sirius is in "virtual contact" with the eye and the brain of the spectator, as G. N. Lewis maintains. In Schrödinger's language, the waves which constitute Sirius are immanent in the wave-configuration which constitutes my organism. If the wave-action of Sirius is sensed as light, the energy-configuration of Sirius is immanent in my eye and brain, though its intensity decreases with the square of the distance. Hence the destruction of Sirius would make an immediate difference to my experience of it. If you reply that it has been proved that light moves 186,000 miles a second, I can retort that it has also been proved by the Michelson experiment that light does not move in the ordinary macroscopic sense, for the motion of the earth makes no difference to the motion of light. In the case of light, the moving body is always at the centre of the sphere of vibration, while in the case of any other vibrations, such as those of water or sound, the moving body, from which a disturbance is started in the medium, would intersect the sphere of vibrations and produce interference. Light, in other words, behaves, with reference to a body moving in its direction or away from it, as though the body were stationary. The duality of causal communication and cosmic immanence is only another phase of the duality of particle and wave—a duality which seems to be pervasive in nature. The upshot of this discussion is that science furnishes a justification in terms of cosmic structure for our direct consciousness of reality.

It is plain that the position, suggested in this paper, is one of universal relativity. But relativity needs to be defined. Some have maintained that it always means subjectivity, *i.e.*, relation to an observer. Others have maintained that it must always be conceived as objective, *i.e.*, independent of the observer. Obviously relativity requires analysis. We must distinguish between objective relativity, which is due to the conditions of nature independently of the attention and interest of the observer; and subjective relativity, *i.e.*, relativity of judgment where the history and interest of the observer are involved. As regards objective relativity we

must distinguish physical relativity, due to conditions in nature which are independent of the percipient organism, and organic relativity, in which the organism is part of the matrix which must be postulated in nature in order that we may understand the causal conditions of the qualitied situation which we are immediately experiencing. Both physical and organic relativity are objective in nature, *i.e.*, they do not depend upon the percipient's attention and interest.

We have defined objective relativity as relativity in nature which is independent of mind, *i.e.*, of attention and interest; and we have distinguished two types of it, *viz.* physical and organic relativity. We must now illustrate these. Physical relativity has become part of our physical outlook on the world because of the epoch-making work of Einstein. Einstein has advanced two theories of relativity, the special or restricted theory, and the general theory, which is a theory of gravitation. The special theory is a highly artificial conception and has little metaphysical significance. Its contribution, so far as it concerns us, is that all observations of nature are made from a frame of reference which has perspective relations in space and time to other frames of reference in relative motion to our chosen frame. So long as we make our observations and measurements on our own frame of reference, no problem arises. Everything happens as though our own frame were stationary. The problem arises when we attempt to make observations and measurements having regard to a frame of reference in motion relative to ours. It then appears that the lengths are shortened and the durations (the clock-intervals) are correspondingly lengthened. This effect is supposed to be reversible. The reason for this is that, in our present ignorance, we do not know the absolute motion of anything, but by Einstein's (or rather, Lorentz's) formula of transformation, we can translate the appearances in the perspectives of relative motion into terms of one another. The special theory is obviously a pragmatic dodge to cover our ignorance. But its importance for us is that it deals with physical effects, which, though they must be observed in order to constitute data for science, are independent of the percipient organism.

Einstein's general theory is a theory of gravitation, but it has been universalized by Weyl into a general theory of cosmic ad-

justment. Both Newton's and Einstein's formulae of gravitation exemplify cosmic adjustment, though in Newton's theory the gravitational adjustment is a direct adjustment of masses to one another in space while in Einstein's theory it is indirect. Instead of bodies directly influencing one another's course in space-time, the bodies change the curvature of space and this determines the course of bodies. But for Weyl the conception of cosmic adjustment has wider implications. Lengths and durations are ultimately conceived as determined by cosmic "curvature", and that explains how measuring rods and clocks which are once congruent when together in space-time may become congruent when again brought together in space-time, irrespective of their adventures in the meantime. Weyl's conception of cosmic adjustment explains the constancy of the electric charge everywhere and the constancy of atomic clocks. Still more broadly stated, it explains the uniformity of nature in its physical and chemical transformations. It involves the principle of immanent cosmic control as well as multiple transformations in space-time, and it is the former which accounts for the regularity of nature. What concerns us here is that such cosmic adjustment is independent of the percipient organism. It is of course true that it is through changes in the percipient organism that we must get our information. But the movements of the planets and the stars and the physical and chemical transformations of nature (including many physical and chemical changes in our own organism) take place whether we are sensibly aware of them or not. The physical conditions of nature vary independently of the organic conditions, and *vice versa*.

In what I have called organic relativity, the organism is part of the situation in nature. The sensible aspects of nature, which furnish our data of knowledge, would not exist unless the organism were part of the matrix of nature. This does not mean that the sensible aspects of nature are relative to mind. Mind in its relation to nature functions as attention and interest. The ambiguous phrases, "in the mind" and "contents of the mind", have played havoc with our modern theories of the knowledge of nature. They are responsible for the solipsism which is implicit in our theories of knowledge since Hume. Philosophers have felt obliged first to

throw the percipient into solipsism and then to try to get him out. They remind me of the country doctor who first must throw his patient into fits—because he was "death on fits". Whatever may have been the success of the country doctor, the epistemologists have never succeeded in getting the percipient out of solipsism, once they got him in—not even when they have inflated his ego to the dimensions of the absolute. For functional realism, the sense-aspects are "in the mind" or are "contents in the mind" in no other sense than that they are attended to. Attending to the size, shape or color of a thing does not constitute these sense-aspects. If attention created the sense-aspects we could make them anything that we might wish. While Berkeley thought that the sense-aspects are created in the perceptual situation, he recognized that they are objective to our interest. They are involuntary and are constituted in relation to objective reality, though for him this objective reality is God and not "inert matter". Since science in his day conceived matter to be inert, he took the logical alternative, that of mind, which he conceived to be active. Now that we conceive matter as energy, his disjunction is no longer coërcive. We hold that the sense-aspects of nature are independent of the mind's operations of attending, judging, etc. That mind as an organization of energy can also produce changes in the organism—its motor adjustments, its distribution of energy—is another story, but it holds even so that the immediate sense-aspects of nature are objective to attention.

According to the conception of organic relativity, the organism with its structures of sense-organs and nervous system enters as a causal factor into the conditions of nature of which the sense-aspects are conceived as emergent characters. To say that sense-aspects are emergent characters does not mean that they are a mere accretion to nature and that we must divest nature of them to get to what it really is. Since our only first-hand acquaintance with nature is through our sense-aspects, this view would land us in hopeless agnosticism. But this is a false bifurcation of nature and human nature. Nature is what it does, and action implies reaction. There is no substance which has a character by itself. All properties are emergent. Nature reveals itself as sense-aspects in its action upon human nature. It is colored, it is sweet,

it is solid, it is extended, it is rhythmic, if it reveals itself as such in the reciprocal action of nature and human nature. It has been said that our sense-perception has to do with the macroscopic world as contrasted with the world of microphysics. It is assumed that there pre-exists a macroscopic world upon which our senses are molded. On the contrary, our macroscopic world emerges in our sense-perception. Locke pointed out that if our senses were microscopic (using the word in its present sense), *i.e.*, if they could sense the minute constituents and motions of things, we should have a very different sort of world and our senses would be useless for practical purposes. It has been said that we sense only surfaces. Such a view substitutes a consequent function for a pre-existent reality, to use Dewey's language. The surfaces are the result of the sensing. The world of microphysics does not present us with continuous surfaces. It is mostly empty space with scattered dots of electrons. It has been said that we must postulate the sensing of material things. This statement exemplifies the same fallacy. Things are called material, not for what they are in themselves, which is meaningless, but because of the group of sense-qualities. To postulate sensa or sensibles is only another instance of the same fallacy. Sensa or sensibles are abstractions in discourse of sensory perspectives.

In saying that nature is its sense-qualities I do not mean to imply that it is only sense-qualities. The energies of nature interact with one another in other contexts beside those of which the organism is part. Perspectives in nature mean not merely the sensible perspectives which emerge from the organism taking account of changes in the environment, or of the changes produced in the organism of part upon part, but also changes in the environment from part taking account of part in space-time relations. Parts of nature reveal to us "aptnesses" or "powers" to act upon one another and produce characteristic changes of which we must take account. No doubt, we must discover these changes in nature through "their effect upon our sensible simple ideas" as Locke puts it, but the changes take place independently of such effects. We infer these physical and chemical changes and the properties involved in nature to account for the variation in our sense-qualities. The kettle of water on the fire starts boiling, the wood in the

grate turns to ashes, the moon changes its relative position, whether we are sensibly aware of these transactions or not. There are other properties in nature besides sense-properties. These are implied in the changes of our sense-aspects, but they are not dependent upon our sense-aspects. They constitute part of the story of nature. They are not more real than the sense-aspects; and, cognitively, we depend upon the latter for our inferences in regard to the former. In short, organic relativity is part of objective nature as much as physical relativity and is independent of mind, *i.e.*, of our attention and interest.

We must now say a word about subjective relativity. Some philosophers regard it a scandal to admit that there is subjective relativity. But surely it plays a very large rôle in human experience. If objective relativity is independent of the attention and interest of the observer, subjective relativity varies with the history and interest of the observer, and these in turn vary with the history and interest of the society of which he is a part. It is notorious that our judgments and evaluations of nature, including human nature, vary from time to time in the history of the individual and in the history of the race. The physical course of nature has been apparently constant during the comparatively brief epoch of human history. But what a marvelous series of transformations have taken place on our earth as a result of human interpretation and experimentation. In a fundamental sense, we must regard the transformations of mind and in turn its transformations of the environment as part of the cosmic process. By mind I do not mean a substance in itself with properties in itself. Mind is a name for functions, as matter is a name for functions. Locke had at any rate the right intuition. With the limitation of his analysis we are not here concerned. He understood that by matter we mean certain sensible qualities such as "bulk, figure, number, situation, and motion of parts", together with "powers" in the parts to produce changes in other parts (implied properties). If we mean by material substance certain properties, we have equal right to mean by spiritual substance that which has certain properties. "By putting together", says Locke, "the ideas of thinking, perceiving, liberty, and power of moving themselves and other things, we have as clear a perception and notion of immaterial

substances, as we have of material." This only means that when nature functions in ways which we recognize as mental it is mental, as much as when it functions in ways we recognize as material it is material. There is no sense in saying that nature functions as mental by virtue of its material aspects any more than in saying that it functions as material by virtue of its mental aspects. One might as well say that it functions as colored by virtue of its olfactory aspects. Since substances are postulated to account for functions they cannot be independent of them. In fact, substances are indices of functions and possible functions. The point I wish to stress is that mental functioning is a genuine and vastly important aspect of nature and that the realm of mental functioning has its own history and establishes its own relativity, *i.e.*, the relativity of our conceptions of nature to our further judgments and evaluations and the relativity of these to history. This is the realm of subjective relativity. It must be understood, however, that subjective relativity does not need to mean private or solipsistic relativity. It may be social relativity—relativity to the group—though it would be dangerous to assert that the whole of any individual's inner life is public or can be made public.

The recognition of relativity does not mean the denial of structure. Heraclitus has been very much misunderstood. He meant to emphasize order (*Logos, Hodos*), rather than change, though he recognized change as a universal fact. In this he does not differ essentially from other Ionian philosophers. It is by his insistence upon order, rhythm and measure in change that he has a unique place. It is because there is order and equivalence in transformation that we can have predictability and science. The qualitied world of our experience is a world of structure. But structure is not revealed to immediate experience. We do not sense structure. For the revealing of structure another organ is required than the senses. In this insight Democritus and Plato agree. Nor do we get structure by immediate intuition. By intuition we can discriminate white from black, but we cannot in that way arrive at the structure of an atom or of a work of art. I have heard that there are philosophers who believe that they have a direct intuition of all "essences". They must have a wonderful faculty of clairvoyance. They should be able to give us the structure of

atoms, molecules, organisms, yea, of the universe, and we could dispense with the plodding, tentative methods of science. Of course, if they only mean that white is white, and black is black, and that you can identify the same black or white, that is no great discovery. A child or even an educated chimpanzee, if it can acquire the linguistic labels, could know as much as that. But there must be an esoteric wisdom, known only to the initiated. For the rest of us the grasping of the structure of things requires both creative thought and experimental testing. This is true equally of the subjective and the objective realm. Most of us do not know the structure of our own mind any more than that of matter by immediate inspection. Whitehead tells us that feeling is a subjective form. But this is a misunderstanding of Plato's *eros*. Love is not form, but spiritual love is a striving for form. It is true that it is the feeling for form which is the drive in both science and art. We must have a feeling for consistency, unity, harmony and simplicity to be moved to seek to produce form, whether it be to create a scientific theory or a work of art. But immediate feeling itself is as amorphous as is sense-perception. Both indeed imply form in the world of which they are aspects—but only to a creative mind.

While the recognition of form must come through the creative insight of the minded organism, that does not mean that the form is only in the mind. Kant was right that unless the mind possesses structure we cannot discover structure. But ordinarily it is not with the structure of mind that we are concerned. We seek the form in the objective situations in nature. The mind does not dictate the form to nature. It does project form into nature and in this sense we may speak of "the ingression of eternal objects", but this "ingression" is tentative and subject to observation and experiment. Scientific "ingression" is a trial-and-error process —unlike Whitehead's "ingression" from a scholastic God. We seek the structure of things which will account for their responsiveness and we check our conception of it by their responses. It is so that we must discover the structure of mind as well as that of matter. We have an *a priori* faith that there is structure in our qualitied world, but what kind it is can be found out only by trial-and-error experimentation, intellectual and physical. If we

came to know the structure of physical things by their responses, so we must ascertain the structure of organisms through their functions. The structure which we conceive to account for reflexes and their conditioning cannot account for the survey, analysis and construction which are characteristic of responses of thinking. No blocking of habits will give rise to thought unless we have an organism with the requisite structure.

The cognitive perspective relation is a real and momentous relation in nature. It has transformed the significance and control of nature in the history of humanity. It is not true, however, as epistemological idealism has maintained, that the cognitive relation is the *ratio essendi*, the ground of existence, of everything. There is an indefinite number of perspectives in nature beside the cognitive perspective. To say that reality cannot be known unless it exists for knowledge is of course mere tautology. The fact that other perspectives of nature may at times enter into the perspective relation of judgment and discourse is possible only because they have existence in their own milieu in nature. Physical and organic perspectives exist whether they are known or not. We must discover them and as yet our knowledge is very limited. But we must not, because cognitive perspectives are not constitutive of other perspectives of nature, ignore the fact that they exist as aspects of nature and involve their own conditions of organization and their own history. Cognitive perspectives or points of view, moreover, are not just abstractions in discourse. They are energy-perspectives and powerful to transform nature. They involve the whole organism at a certain level of organization and functioning. And they do not exist *in vacuo* but function in the milieu of nature, of which the social milieu is an essential part. The cognitive relation has its own characteristic duality[7] of subject and object or referent and relatum. It is in the cognitive relation that our qualitative perspectives become data. They are not data in themselves, but only for cognitive experimentation. It should be pointed out that cognitive duality of subject and object does not coincide with the distinction of subjective and objective perspectives, previously made. Object in the cognitive

[7] See the author's *Truth and Reality* (1911) 138-141.

relation may be physical, organic or mental. It means any aspect selected as a datum by the cognitive interest. It may be gravitation or a toothache or $\sqrt{-2}$. Cognitive perspectives, therefore, may cut across any other perspectives, or rather, any perspective may become a datum for the cognitive interest, including the cognitive interest itself. But this has nothing to do with the existence of other perspectives in their own milieu of nature. Since all perspectives are selective relations in nature, the cognitive perspective enjoys no metaphysical priority over others. It is only one type of selective relations in nature. It involves indeed a specific type of organization of the referent and a specific type of community with nature. But that is true of other perspectives as well. The cognitive relation is distinguished from all other types of adjustment in that in it error exists as part of the adjustment. There is no error in physical or organic perspectives. Error is due to the striving at creative anticipation of nature by means of ideas. This is the realm of adventure of creative mind.

It has been said that thought is talk, and it is true that social communication is a necessary medium for the development of thought. But we cannot say that talk is thought. We know of too much talk that does not reveal thought. Language and communication are not sufficient to account for thinking. There must evolve in nature a structure with its own peculiar restlessness. Thought is evolved as an expression of the urge for life and a more abundant life. It is an aspect of vital adjustment and itself is a vital function as much as digestion. For thought to come to actuality there must evolve not only certain cerebral structures and certain vocal structures, but also a social milieu for expression. Thought presupposes the urge of our whole biological history, of our social milieu, as this becomes a part of us, and the immanent cosmic *eros* or love for form. It analyses our qualitative experience. It particularizes or universalizes its selected qualitative aspects according to its interests. Particularity is no more given than universality. Both are predicates in significant discourse. By means of language, thought fixates qualitative experience into "essences" or universal predicates, and it creates ideal structures by means of which it tries to unlock the inner nature of things. But it has no key to structure except function and its conceived

structure must prove relevant to function as revealed in our experience of nature. As part of vital activity, thought first of all works for the furtherance of biological wants, but it may emancipate itself from these. It may become absorbed in the interest in comprehending the structure of things and become pure science, or it may set itself to incarnate form in objects which shall satisfy its feeling for beauty, without reference to utilitarian demands, and express itself as art. But as an activity it must be grasped in its kind and cannot be reduced to the simpler activities of reflex and habit. As a vital activity, thought involves the whole organism with the whole gamut of structures and activities—sensory, motor, affective, mnemic, ratiocinative—in a milieu of nature which includes society.

Thought is deeper than rationalization. It is an urge born out of the unconscious depths of our racial and personal life in the cosmos, seeking light and meaning in an apparently confused world. At the lowest level of nature things exist in a vague, undifferentiated mutuality. But in the course of time, through an immanent urge in nature, structures and organs become differentiated, so as to respond more adequately to the environment and make a fuller life in nature possible. So senses are constructed. Then other structures are evolved to respond in time as well as in space, such as habit and memory. At length there is the consciousness of the small voice of spirit, midst the babel of impulse. There is the reaching out for form, the fashioning of intelligence, the feeling for beauty. Who can doubt that spirit is as truly part of nature's striving as are the structures and organs which have to do with our primitive biological needs? And does not spirit require its own characteristic environment and its own characteristic satisfaction? At any rate there are those who do not live by bread alone and who regard the primitive biological needs as mere means to the attainment of the values of spirit—the values of truth and beauty. If we call such satisfactions a "balanced metabolism", they at any rate involve a level of organization and satisfaction different from that of a sound digestion, though this is not to be despised. They mean the establishing of a type of *rapport* with the environment other than mere physical and biological adjustment. As qualitative satisfactions they are a whole-

response to nature of another order—the response to spirit in nature.

Since the ideal aspects of our experience of nature are as real, as much part of nature, as the sensory, the ideal aspects imply a mutuality with nature that is appropriate to their character. If we are interested in what sort of universe makes our sense-aspects possible, we should be interested in what sort of universe makes our spiritual experience possible. It is true that in either case human nature is part of the situation and gives its own character to the result. Our experiencing of nature and our interpretation of nature are human, all too human. We cannot speak for God, as Kant truly saw. But we must not forget that human nature is part of the cosmic matrix and must be understood in that matrix. This is as true of the spiritual level of thought and appreciation as of the level of sense. In either case, it is the cosmic matrix which furnishes the stimulus to adjustment and at length rewards life with such rapport as its capacity for responsiveness makes possible. Beauty is not all in the percipient, though the percipient must be properly organized. While the appreciation of beauty is an organic adjustment, it is not all organic, but an adjustment of the organic to the harmony in nature.

JOHN ELOF BOODIN

THE UNIVERSITY OF CALIFORNIA AT LOS ANGELES

PROCEEDINGS OF THE AMERICAN PHILOSOPHICAL ASSOCIATION 1933

SEVENTH ANNUAL REPORT OF THE BOARD OF OFFICERS

American Council of Learned Societies

At the annual meeting of the American Council of Learned Societies held in Philadelphia, January 28-29, 1933, the American Philosophical Association was represented by its two delegates, W. A. Hammond and F. J. E. Woodbridge, and by the Secretary. In addition to many matters of general interest, seven or eight items of direct interest to philosophy came before the meeting for approval, involving and securing in subventions about $48,000. The subventions in question ranged all the way from continuing support of William A. Heidel's *History of Greek Thought prior to Aristotle* to a census of Alchemical and other Medieval manuscripts in America. Two direct appropriations were made to the American Philosophical Association: (1) Five hundred dollars for the perfection of the plans of the Committee on Bibliography for the preparation and publication of a *Bibliography of Philosophy from 1900 to the Present,* (2) One thousand dollars for the publication of a *Bibliography on the Philosophy of the Fine Arts,* already prepared by William A. Hammond.

Committees

Bibliography—During the year D. W. Prall was duly appointed to represent the Pacific Division and to fill the vacancy left by the retirement of C. H. Farman. The following report of the Committee is submitted by its chairman:

> The Committee's efforts to make arrangements for the inception of the project met with success in May, when the Department of Philosophy of Columbia University agreed to undertake the work involved, provided that an appropriation of $800 a year for two years, by the Humanities Council of Columbia University, should be supplemented by a sum of $600 a year for three years, to be provided by the American Philosophical Association. The Association having no funds with which to finance the work, laid this plan before the Executive Committee of the American Council of Learned Societies, which at its meeting of May 20 approved the plan, and authorized the payment to the American Philosophical Association of the sum of $500, which had been placed at the disposal of the Executive Committee by vote of the Council last January, to be applied in the Committee's discretion toward the expenses incident to the organization of the project. The Association understands that this payment serves as a first instalment of the total sum of $1,800, to be made available as authorized by the Council.
>
> The Council had previously appropriated $1,000, to be used in the publication of a bibliography of Aesthetics, from 1900 to the present,

that had already been prepared by Professor Wm. A. Hammond. This bibliography, which includes 2191 titles, was published as a supplement to the May 1933 issue of the PHILOSOPHICAL REVIEW, in a volume of viii+183 pp. A valuable feature of this bibliography is the addition to many of the titles of brief notes calling attention to some feature of the work listed, likely to be of special interest to the student.

With regard to the Yearly Philosophical Index, which is to supplement the bibliography, an arrangement is being considered. The *Journal of Philosophy* has indicated its willingness to assume responsibility for it, if the completion of the Bibliography of Philosophy is assured. The plan is to begin the Index with 1933 and to publish it as a number of the *Journal of Philosophy*.

For the Committee on Bibliography,
C. J. DUCASSE, *Chairman*.

Carus Lectures

During the past year the Open Court Publishing Company has brought out the third volume in the Paul Carus Lecture Foundation series. This volume, bearing the title *The Philosophy of the Present*, includes considerable material in addition to the three lectures delivered by George H. Mead at the meeting of the American Philosophical Association held at the University of California in December 1930.

The fourth series of lectures on the Paul Carus Foundation was delivered by William Pepperell Montague on the occasion of the meeting of the American Philosophical Association at the University of Chicago, September 6 to 9, 1933. These lectures were three in number and dealt with the general subject, *The Great Visions of Philosophy*.

For the Committee on the Carus Lectures,
EDWARD L. SCHAUB, *Chairman*.

Eighth International Congress of Philosophy (Prague, 1934)

1. By the terms of the Committee's appointment, the Acting Secretary and the Honorary Secretary of the Committee for the VII Congress were continued in office. The Committee completed its organization by re-electing Professor W. P. Montague as Chairman. It then notified the Prague Organizing Committee of its readiness to cooperate.

2. Professor Montague has been invited by the Prague Committee to deliver one of the principal lectures at the close of the Congress.

3. At the request of the Prague Committee, Professor T. V. Smith of the University of Chicago, Editor of the *International Journal of Ethics*, has been nominated as a leader of the discussion of Method in Sociology and the Social Sciences at one of the chief sessions of the Congress.

4. The Committee is advising with members of the Association who desire to present papers at the Congress. It will be possible to do this more effectively when the Programme has been received and announced in the journals.

5. The Committee understands that the vote of the Board in December 1930 authorizes it to use the fund in the hands of the Treasurer

of the Association to further the representation of the Association at the Congress.

For the Committee,
A. C. ARMSTRONG, *Honorary Secretary*

Publication

Source Books in the History of the Sciences—During the past year a little progress has been made upon this project. The manuscript for a *Source Book in Physics* has been revised somewhat by the special editor in charge of that work, Professor William F. Magie of Princeton University. The manuscript for a *Source Book in Geology* has been completed by Dr. Shirley L. Mason under the supervision of Professor Kirtley F. Mather of Harvard University. Both these manuscripts will be put upon the market as soon as a revival of business conditions may warrant such a step. The manuscript for a *Source Book in Botany* is gradually taking shape under the special editorship of Professor R. A. Harper of Columbia University with the coöperation of Professor C. E. Allen of the University of Wisconsin and Professor D. S. Johnson of the Johns Hopkins University. Professor Frederick Barry of Columbia University is making progress on a *Source Book in Chemistry*, although slowly in consequence of the pressure of other duties. There has been much difficulty experienced in securing a man to take charge of a volume on zoology. At least a dozen men have been approached, each thoroughly equipped to undertake such a task, but for one reason or another no one has as yet consented to do so. Negotiations are under way at present with another eminent zoologist and it is hoped that he may see his way toward assuming this special editorship.

GREGORY D. WALCOTT, *General Editor*

FINANCIAL STATEMENT
January 2, 1934

American Philosophical Association
H. G. Townsend, Secretary
Eugene, Oregon

DEAR SIR:

Pursuant to your instructions I have examined the accounts and records of the American Philosophical Association for the year ended December 31, 1933, and submit herewith statements of cash receipts and disbursements of the various funds for the year ended that date.

Verification of cash balances, receipts and disbursements was made by examination of receipted bills, cancelled checks, correspondence, pass books, etc. All the information required was furnished.

I certify that the following statements of cash receipts and disbursements of the Revolving Fund for Publication, Fund for the Eighth International Congress of Philosophy, and the General Treasury of the

American Philosophical Association are, in my opinion, correct and accurately reflect the financial operations for the year ended December 31, 1933, and the cash position as at December 31, 1933.

Respectfully submitted,

O. K. BURRELL
Certified Public Accountant

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS
YEAR ENDED DECEMBER 31, 1933

General Treasury		
Balance January 1, 1933		$ 385.14
Receipts		
Eastern Division	$326.80	
Western Division	149.64	
Pacific Division	57.00	533.44
Total		$ 918.58
Disbursements		
A.C.L.S. Dues	$ 25.00	
Annual Report		
Printing and Mailing	259.24	
Proceedings and Membership List	96.46	
Stationery	12.60	
Carus Lectures, Announcements, etc.	80.60	
Stenographic Help	17.00	
Stamps	10.00	
Audit (1932)	10.00	
Check Tax	.28	511.18
Balance December 31, 1933 (U. S. National Bank, Eugene, Oregon)		$ 407.40
Revolving Fund For Publication		
Balance January 1, 1933		$ 9,759.76
Receipts		
Interest on bank deposits	$232.42	
Royalties (McGraw-Hill Co.)	38.20	270.62
Total		$10,030.38
Disbursements		
Source Book in Physics (W. F. Magie)	$277.60	
Source Book in Geology (Shirley L. Mason)	800.00	
Exchange and Check Tax	.53	1,078.13

Balance, December 31, 1933 (First National Bank, Portland, Oregon)		$ 8,952.25
Fund for the Eighth International Congress of Philosophy		
Balance January 1, 1933		$ 630.87
Receipts		
Interest on bank deposits	$ 19.19	
Royalties (Longmans Green Co.)	11.54	30.73
Total		$ 661.60
Disbursements		
Check tax on transfer of funds		.02
Balance, December 31, 1933 (First National Bank, Eugene, Oregon)		$ 661.58
Recapitulation of Funds—December 31, 1933		
General Treasury (U. S. National Bank, Eugene, Oregon)		$ 407.40
Revolving Fund for Publication		8,952.25
Eighth International Congress		661.58
Total		$10,021.23

Respectfully submitted,
H. G. TOWNSEND, *Secretary*
For the Board of Officers

WESTERN DIVISION

President: J. D. Stoops
Vice-President: C. B. Vibbert
Secretary-Treasurer: E. T. Mitchell
Executive Committee: The foregoing officers and Albert E. Avey, Karl Schmidt, C. E. Cory, and D. S. Robinson.

The thirty-fourth annual meeting of the Western Division was held in connection with the general meeting of the Eastern, Western, and Pacific Divisions for the reception of the Fourth Series of the Carus Lectures. The meeting took place at International House of the University of Chicago, September 6 to 9 during the period of the Century of Progress Exposition.

The Fourth Series of Carus Lectures was delivered by Professor William Pepperell Montague of Barnard College, Columbia University under the general title, *The Great Visions of Philosophy,* the three lectures being entitled: *Philosophy as Vision, Democritus and the Vision of a World of Atoms, Plato and the Vision of Eternal Things.*

The following program of papers and round-table discussions was presented:

Metaphysics; The Domain of Ignorance.....Paul Weiss
Emergents *sub Specie Aeternitatis*.....Charles M. Perry
Event and World-Point .....A. Ushenko
Pragmatism and Metaphysics .....Charles W. Morris
The Idea of the Individual in Russian Philosophy.....N. Lossky
The Nature and Function of Definitions in Deductive Logic.....
..... Karl Schmidt
Causality and Teleology in the Cultural and Social Sciences.....
..... Bonno Tapper
Many Logics or One?.....David F. Swenson
Some Problems for a Relativistic Epistemology....A. G. Ramsperger
The Predicament of a Naturalistic Empiricism, John Dewey's Ineffable .....Howard D. Roelofs
Logical Analysis of the Psycho-Physical Problem: a Contribution of the New Positivism (Viennese Circle).....Herbert Feigl
The Relativity of the Physical World in Relation to the Absolute Character of Value .....John S. Marshall
The Basis of Social Ethics.....Charner M. Perry
The Social Ethical Implications of Confidence.....Howard O. Eaton
Acquiescence as an Ethical Concept.....Theodore B. Brameld
The Relation between Form and Association in Art..Van Meter Ames
The Aesthetic Response: An Antinomy and its Resolution.....
.....Milton C. Nahm
The Need of Sophistication in Ethics.....Albert C. Chandler
The Absolutes of Pragmatic Ethics .....Maurice Baum
Presidential Address: The Greek Concept of Nature..M. T. McClure

The following telegram received by Professor Paul Weiss was laid before the meeting for consideration:

> We urge you and Professor Montague present motion that committee be appointed to draw resolution protesting against suppression by German Government of freedom of philosophic thought and expression and the unjustifiable deprivation of academic status of students and teachers of philosophy. Please use this telegram as procedure demands.
>
> Felix S. Cohen, Philip Paul Wiener,
> Wm. T. Terry, Lewis S. Feuer.

The Executive Committee recommended that in view of the delicacy of the matter and the desirability of any such protest being backed by the largest and most representative professional group in America a committee be named by the President to confer with the American Council of Learned Societies, the committee being given power to act. This recommendation was adopted, and President McClure named Professor G. Watts Cunningham, Professor A. E. Burtt, and the Secretary, to form the committee.

Under the heading of business arising from the minutes of the last meeting the question of changing the date of the regular meeting from the Easter interval to the Christmas vacation was raised. The Secretary reported the result of the written ballot to be: For the change, 29; opposed, 31. Since the vote was indecisive, and too light to indicate any strong sentiment in favor of the change, this perennial question was settled by unanimous agreement to make no change at the present time. It was suggested by Professor Sharp, however, that the spring interval, in those institutions which have one at all, does not always fall at Easter-tide. He moved, seconded by Professor E. S. Ames, that the secretary be instructed to secure information from the various universities and colleges as to the dates of their spring interval. Motion carried.

Uniform membership rules and standards. The Executive Committee recommended that the Secretary of the Western Division confer with the Secretaries of the other Divisions with a view to drawing up uniform standards and rules of membership, and report at the next meeting. Recommendation adopted.

Associate membership. Pending the adoption of uniform rules of membership in the three Divisions it was agreed, on motion of Conger and Farley, to open associate membership to persons who do not qualify for active membership but who have an active interest in philosophy.

In response to the suggestions of several members Professor Burtt, for the Executive Committee, brought in the following resolution:

That this Division express to the other Divisions of the American Philosophical Association its readiness to co-operate with them, either by the formation of a joint committee or in whatever manner may appear most desirable, for the purpose (1) of studying the problem of increasing the opportunities for the employment of men and women trained in philosophy, and reporting their conclusions with recommendations to the Executive Committee at as early a date as may be practicable; and (2) of dealing immediately in whatever way may seem most effective with the problem of bringing teachers of philosophy at present unemployed into touch with vacancies which they might acceptably fill.

The motion was discussed by Professors Sharp, Baum, Larrabee and others and unanimously adopted.

Membership. The Secretary reported that the Western Division had 175 members at the beginning of the year. Five members had been dropped during the course of the year, three had transferred to other Divisions, and two had transferred from other Divisions to the Western. The following twelve applications for active membership were received and approved by the Executive Committee: Wilhelm Anderson, Archie J. Bahm, Leo V. Barker, O. K. Brouwsma, Theodore B. Brameld, John Clark, Horace S. Fries, Albion R. King, Mrs. Mary

Shaw Kuypers, R. A. Schermerhorn, Leo R. Ward, and Hugh Van R. Wilson. The following applications were approved for associate membership: Theda Gildermeister, Joseph M. Roth.

The following financial statement of the Secretary-Treasurer was received and approved:

Receipts		
On hand, March 1932		$500.35
Dues of members		245.42
Interest on savings account		17.44
Total		$763.23
Expenditures		
Smoker, Ann Arbor meeting	$ 5.00	
American Philosophical Association		
A.C.L.S.	$ 7.27	
Membership dues	43.75	
Proceedings	50.07	101.09
Stenographic services		47.20
Stamps		37.75
Letterhead and stationery		26.95
Programs and cards		28.00
Total		245.99
Balance on hand		$517.22

Professor D. S. Robinson called attention to the fact that the year 1935 marks the anniversary of the birth of Wm. T. Harris, and that it would be appropriate to commemorate the occasion. Moved by Robinson, seconded by Sharp, that a committee be appointed to consider the matter and report at the next meeting. Carried.

Moved by Professor T. V. Smith that the time and place of the next meeting be left to the decision of the Executive Committee. Carried.

Professors Karl Schmidt and F. C. Sharp moved a vote of thanks to the University of Chicago, International House, and others responsible for the excellent quarters and arrangements provided for the meeting. Carried by standing vote.

E. T. Mitchell, *Secretary-Treasurer*

EASTERN DIVISION

President: Warner Fite
Vice-President: F. S. C. Northrop
Secretary-Treasurer: Harold A. Larrabee
Executive Committee: H. T. Costello (1934), H. B. Smith (1934),

George Boas (1935), Cornelius F. Krusé (1935), R. M. Blake (1936), Percy Hughes (1936), C. I. Lewis *ex officio* for one year.

The thirty-third annual meeting was held at Amherst College, Amherst, Massachusetts, December 28-30, 1933. The following program was presented:

Symposium: The Status of Mind in Reality.....
.....Charles W. Hendel, Arthur E. Murphy, James B. Pratt
What is Materialism? .....Sidney Hook
Appearance and Orientation .....Grace A. de Laguna
On the Attributes of Material Things.....C. J. Ducasse
Verifiability, Truth and Verification.....Ernest Nagel
The Conception of the Psyche in Plato's Metaphysics..Raphael Demos
The Universe of Light .....Frederick J. E. Woodbridge
The Principles of Evaluation in Aesthetics.....A. Myrton Frye
Political Fictions, Norms and Postulates.....Marie C. Swabey
The Concept of "Usury"—The History of an Idea..Carl F. Taeusch

The business meeting was called to order at 2 P.M. Saturday, December 30, with President Lewis in the chair. The minutes of the thirty-second annual meeting were approved as printed.

TREASURER'S REPORT

Receipts		
Balance brought forward	$2,073.54	
Membership dues	664.00	
Interest	85.84	
Refund on stamped envelopes	12.42	
Total		$2,835.80
Expenditures		
Dues to National Association	$ 95.00	
Dues to Council of Learned Societies	15.20	
Printing of Annual Report	216.60	
Expenses 1932 Annual Meeting	37.55	
Stencils and mimeographing	13.20	
Printing, stamped envelopes, postage, etc.	107.14	
Secretarial Assistance, mailing, etc.	35.48	
Net loss on Canadian exchange	.27	
Federal taxes on checks	.34	
Total		520.78
Balance on hand		$2,315.02

Audited and found correct { Cornelius F. Krusé
Charles A. Baylis
Auditors

The following recommendations of the Executive Committee were presented to the meeting and approved: (1) That the work of the Committee on Appointments continue for the present to be carried on through the Secretary's office; (2) That the Executive Committee be empowered to join with the other divisions in the formation of a national committee to study the general problem of increasing the opportunities for employment of men and women trained in philosophy, this committee to report its findings to the several divisions for adoption; (3) That the Executive Committee be empowered to appropriate an amount not exceeding twenty-five cents a member to the general fund of the Association in order to make possible a contribution to the Bibliography of Philosophy and Philosophical Index, provided the other divisions take similar action; and (4) That it is the sense of this meeting that the Executive Committee is justified, under the present emergency conditions, in interpreting somewhat liberally the membership rules of this division so far as these relate to professional employment.

The Executive Committee was authorized to send congratulatory messages to the Pacific Division on the occasion of its tenth anniversary, and to George Santayana on the occasion of his seventieth birthday. A message of condolence to the family of the late Émile Meyerson was also authorized.

The Nominating Committee (J. H. Tufts, Chairman, A. C. Armstrong, and A. O. Lovejoy, presented the following nominations, for which the secretary was instructed to cast a unanimous vote: for President, Warner Fite; for Vice-President, F. S. C. Northrop; for new members of the Executive Committee for three years: R. M. Blake and Percy Hughes.

Memorial resolutions concerning the following active members who died during the year were read, ordered spread upon the minutes of the division, and transmitted to the families of the deceased: Felix Adler (by James Gutmann), Durant Drake (by Edgar S. Brightman), Eleanor A. Gamble (by Thomas H. Proctor), John G. Hibben (by Edward G. Spaulding), Clara M. Hitchcock (by Anna A. Cutler), Arthur C. McGiffert (by Eugene W. Lyman), and Woodbridge Riley (by Herbert W. Schneider).

The following nominees for active membership were recommended by the Executive Committee and elected: Moses J. Aronson, Archie J. Bahm, Lawrence W. Beals, David Bidney, Hubert Bonner, Jesse S. Boughton, Daniel J. Bronstein, Ralph W. Church, Albert H. Dunham, Charles A. S. Dwight, Henry M. Estall, E. J. Fenlon, Lucius Garvin, Louis Harap, Paul Henle, Roger W. Holmes, Ross E. Hoople, Haym Jaffe, G. Adolf Koch, Milton R. Konvitz, Otto F. Kraushaar, Yervant H. Krikorian, Roderick D. MacLennan, Jesse V. Mauzey, Blanchard

W. Means, Dale H. Moore, Howard Selsam, Hugh Van R. Wilson, Charles M. Wiltse. Associate members: William Gruen, Herbert Lamm, Nathan Lazar. The transfer of membership of John Wild from the Western Division to the Eastern Division was formally approved.

Upon the suggestion of Professor W. K. Wright, the Executive Committee was requested to consider the feasibility of mailing abstracts to members in advance of the annual meetings.

By a unanimous rising vote the Division expressed its thanks to Amherst College and especially to Professor Sterling P. Lamprecht, chairman of the local committee, for their cordial hospitality and the excellent arrangements for the entertainment of their guests. The selection of the place of meeting in 1934 was left to the Executive Committee.

Harold A. Larrabee, *Secretary-Treasurer*

PACIFIC DIVISION

President: James H. Tufts
Vice-President: S. C. Pepper
Secretary-Treasurer: H. G. Townsend
Executive Committee: The foregoing officers and J. E. Boodin *ex officio* for one year, G. P. Adams (1934), D. A. Piatt (1934), E. E. Ericksen (1935).

The tenth annual meeting took place at the University of California at Los Angeles, December 28, 29, 30, 1933. The following program was presented:

The Concept of Karma in Vedic Philosophy (Read by title only)..
.....E. T. Dana
A Critique of Schlick's Claims to Standpointlessness....P. A. Schilpp
A Wish Theory of Art.....E. A. Robinson
Worlds in which we Participate.....H. B. Alexander
Concatenism .....William Savery
Symposium: Mind, an Event in Physical Nature
"The Mind's Excursive Power" (Read by title only)...G. P. Adams
The Existence of the Physical World.....V. F. Lenzen
The Physical Location of the Cognitive Datum...D. C. Williams
The Recrudescence of *Physis* .....W. H. Long
The Name *Materialism* .....William Savery
Equality as a Moral Value .....J. H. Tufts
The Comedy of Immediacy in Hegel's *Phenomenology*..J. Loewenberg
The Presidential Address: Functional Realism .....J. E. Boodin
Thought and Analysis .....E. W. Hall
The New Materialism—A Critique .....H. L. Searles

The Self and its Object in Racial Cultures.....E. D. Starbuck

At the business meeting the minutes of the previous meeting were approved as printed. The Treasurer's report was presented and accepted.

Balance—January 1, 1933			$227.55
Receipts from dues			112.00
Total			$339.55
Expenditures:	A.P.A. Treasury	$57.00	
	Printing	13.50	
	Clerical help	2.70	
	Postage	9.00	
	Telegram	.76	
	Check tax	.16	
Total			$ 83.12
Balance—January 1, 1934			$256.43

Examined and found correct: V. F. Lenzen

On recommendation of the Executive Committee the President was authorized by vote to appoint some member of the Division to act with representatives of the other Divisions, if and when such are appointed, to investigate the employment situation as it affects teachers of philosophy.

It was voted to make an appropriation from the funds of the Division of an amount not to exceed twenty-five cents for each member as a contribution to the general treasury to assist in defraying the cost of a *Philosophical Index* provided one of the other Divisions takes similar action.

It was voted to accept the invitation of the University of California to meet in Berkeley next year.

The following persons were transferred from other Divisions: B. A. G. Fuller, Everett W. Hall as active members and J. Harold Bradley as an associate member. The following persons were elected to active membership: J. Hudson Ballard, J. Herschell Coffin, Robert E. Fitch, Kate Gordon, Rolf Hoffmann, Wm. H. Roberts, Theodore G. Soares; to associate membership: J. T. Bunyan, J. B. Burgess, L. W. Hattersley, W. Hardin Hughes, Paul A. Reeder, E. Parl Welch, J. A. Williams.

The Executive Committee announced its purpose to recommend a change in the rules for admission to associate membership at the next annual meeting.

The following officers were elected: President, James H. Tufts; Vice-President, S. C. Pepper; member of the Executive Committee, E. E. Ericksen.

After a unanimous vote of appreciation and thanks to its hosts the meeting adjourned.

H. G. Townsend, *Secretary-Treasurer*

DIRECTORY OF OFFICERS AND COMMITTEES OF THE ASSOCIATION FOR 1934

(Addresses are given in the list of members. A date following a name indicates that the individual's tenure expires by limitation at the close of the calendar year mentioned.)

Board of Officers:

James H. Tufts, *Chairman* (1934), Warner Fite, J. D. Stoops, H. A. Larrabee, E. T. Mitchell, H. G. Townsend, *Secretary* (1935).

Representatives to the American Council of Learned Societies:

W. A. Hammond (1934), F. J. E. Woodbridge (1936).

Committees:

Bibliography—

C. J. Ducasse, *Chairman*, D. S. Robinson, D. W. Prall.

Carus Lectures—

E. L. Schaub, *Chairman*, H. B. Alexander, Mary Hegeler Carus, M. R. Cohen (1935), W. P. Montague (1935), D. H. Parker (1935), C. I. Lewis (1937), E. B. McGilvary (1937), R. A. Tsanoff (1937).

Eighth International Congress of Philosophy—

W. P. Montague, *Chairman*, A. C. Armstrong, *Honorary Secretary*, J. J. Coss, *Acting Secretary*, G. P. Adams, E. B. McGilvary, R. B. Perry, George Rebec, W. M. Urban.

Publication—

A. O. Lovejoy, *Chairman*, E. A. Burtt, H. R. Smart.

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